



Transportation Concept Report

Interstate 580 West

District 4




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California Department of Transportation

Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability

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Stakeholder Acknowledgement

District 4 is pleased to acknowledge the stakeholders and partner agencies in development of this Transportation Concept Report (TCR). Preparation of this document was coordinated with the Metropolitan Transportation Commission (MTC), the Alameda County Transportation Commission (Alameda CTC), the City of Albany, the Contra Costa Transportation Authority (CCTA), the West Contra Costa Transportation Advisory Committee (WCCTAC), the City of Richmond, the Transportation Authority of Marin (TAM), the County of Marin, the City of Larkspur, the City of San Rafael, Alameda-Contra Costa Transit District (AC Transit) and Golden Gate Transit District.

This Final TCR will be posted on the Caltrans Corridor Mobility website at:

<http://www.dot.ca.gov/hq/tpp/corridor-mobility/>

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ABOUT THE TRANSPORTATION CONCEPT REPORT

System Planning is the long-range Transportation Planning process for the California Department of Transportation (Caltrans). The System Planning process fulfills Caltrans statutory responsibility as owner/operator of the State Highway System (SHS) (Gov. Code §65086) by evaluating conditions and proposing enhancements to the SHS. Through System Planning, Caltrans focuses on developing an integrated multimodal transportation system that meets Caltrans goals of Safety and Health, Stewardship and Efficiency, Sustainability, Livability and Economy, System Performance and Organizational Excellence.

The System Planning process is primarily composed of four parts: the District System Management Plan (DSMP), the Transportation Concept Report (TCR), the Corridor System Management Plan (CSMP), and the District System Management Plan (DSMP) Project List. The District-wide **DSMP** is a strategic policy and planning document that focuses on maintaining, operating, managing, and developing the transportation system. The **TCR** is a planning document that identifies the existing and future route conditions as well as future needs for each route on the SHS. The **CSMP** is a complex, multi-jurisdictional Planning document that identifies future needs within freeway corridors experiencing or expected to experience high levels of congestion. The CSMP serves as a TCR for segments covered by the CSMP. The **DSMP Project List** is a list of planned and partially programmed transportation projects used to recommend projects for funding. These System Planning products are also intended as resources for stakeholders, the public, partner, regional, and local agencies.

TCR Purpose

California's State Highway System needs long-range Planning documents to guide the logical development of transportation systems as required by CA Gov. Code §65086 and as necessitated by the public, stakeholders, and system users. The purpose of the TCR is to evaluate current and projected conditions along the route and communicate the vision for the development of each route in each Caltrans District during a 20-25 year Planning horizon. The TCR is developed with the goals of increasing safety, improving mobility, providing excellent stewardship, and meeting community and environmental needs along the corridor through integrated management of the transportation network, including the highway, transit, pedestrian, bicycle, freight, operational improvements and travel demand management components of the corridor.

STAKEHOLDER PARTICIPATION

Stakeholder participation was sought during the development of the Interstate 580 (I-580) West TCR. During the information gathering stage for the TCR, existing plans and studies from stakeholder agencies were reviewed for initial input. As the document was finalized, stakeholders were asked to review the document for accuracy and consistency with regard to existing plans, policies and procedures, and to provide additional project ideas that helped inform the Corridor Concept. The process of including stakeholders adds value to the TCR by allowing for outside input and ideas to be reflected in the document and help strengthen public support.

EXECUTIVE SUMMARY

Concept Summary

Within District 4, Interstate (I-) 580 is a four to nine-lane divided freeway which begins at the Alameda/ San Joaquin County line, continues west through the cities of Livermore, Pleasanton, Castro Valley, Oakland, Berkeley, Albany, and Richmond and crosses San Pablo Bay via the Richmond – San Rafael (RSR) Bridge terminating at United States (US) 101 in San Rafael. Between Oakland (post mile [PM] ALA_80_2.56) and Albany (PM ALA_80_7.36), I-580 is coterminous with I-80. The I-580 West Corridor (Corridor) represents the most western and final leg of I-580, from the I-80/I-580 north split in the City of Albany in Alameda County to US 101 in the City of San Rafael in Marin County. It serves local traffic between Richmond and San Rafael, supports interregional travel and goods movement through direct access to US 101 (via the RSR Bridge), and carries local truck traffic supporting general commerce in Marin county. The I-580 Corridor provides alternate access to San Francisco from the East Bay, especially to the Presidio and northern/western parts of San Francisco via US 101 and across the Golden Gate Bridge. This Corridor also provides primary access from the East Bay to the North Bay and points beyond via US 101 including recreational opportunities on the California coast throughout the year. This I-580 West TCR evaluates current traffic conditions along the route using 2014 as the base year and provides forecast conditions for 2020 and 2040. Segmentation for this TCR is based upon changes in jurisdictional borders, facility types, lane configurations, access, land use and/or travel demand. The concept reflects a Transportation Systems Management and Operations (TSMO) approach that combines managed lanes, ramp metering, Intelligent Transportation Systems (ITS), and multimodal improvement strategies, and takes into consideration projects and concepts supported by local jurisdictions and agencies along the Corridor.

Table ES 1. I-580 West Segmentation and Concept Summary

Segment	PM	Segment Description	Existing Facility	25-Year Capital Facility Concept*	25-Year System Operations and Management Concept
1	ALA_580 R47.17 – CC_580 6.13	I-80/I-580 North Split to Toll Plaza	5-6F	5-6F**	<ul style="list-style-type: none"> • Additional mainline detection • Ramp metering deployment • All electronic toll collection • Multimodal improvements
2	CC_580 6.13 – MRN_580 2.48	Toll Plaza to West End of the Richmond San Rafael Bridge	4F	4F + 1 PPUL**	<ul style="list-style-type: none"> • Additional mainline detection • Multimodal improvements
3	MRN_580 2.48 – MRN_580 4.78	West End of Richmond San Rafael Bridge to US 101	4F	4-5F	<ul style="list-style-type: none"> • Additional mainline detection • Ramp metering deployment • Multimodal improvements

* This TCR recommends studying the feasibility of restoring the previous westbound (WB) HOV lane in Segment 1 between Central Avenue and Marine Street and extending it to the Toll Plaza. However, the HOV lane is not included as part of the 25-year Capital Concept at this time.

** F=freeway lane PPUL = peak period use lane

Concept Rationale

Segment 1

Segment 1 of the I-580 West Corridor will remain a five to six-lane freeway. In the eastbound (EB) direction, a bottleneck downstream on WB I-80 currently causes traffic to backup onto I-580 during the AM peak, while an additional bottleneck at the Central Avenue on-ramp is expected to develop during the PM peak in 2040. Capacity increasing projects on EB I-580 will not solve the bottleneck on I-80 and fixing the future bottleneck at Central Avenue may exacerbate the I-80 bottleneck. Instead, attention should be given to the implementation of ramp metering at freeway on-ramps as well as freeway-to-freeway connectors to better manage the flow of traffic within the Corridor. The existing I-80/I-580 Interchange is missing two movements: from WB I-80 to WB I-580 and from EB I-580 to EB I-80. However, because the two freeways run roughly parallel to each other in close proximity at this location, local streets such as Buchanan Street, Central Avenue and Richmond Parkway already provide sufficient capacity for traffic making such connections. Therefore, this TCR does not propose new direct connectors at this location. An EB lane will be added to the section between the east end of the RSR Bridge and Marine St/East Standard Avenue. This additional lane is part of the RSR Bridge Access Improvement Project. In the WB direction, no change is proposed for the 25-year Capital Concept, although this TCR recommends a study to examine the feasibility of restoring the previous WB high occupancy vehicle (HOV) lane between Central Avenue and Marin Street and extending it to the Toll Plaza, in addition to improvements listed in the Multimodal Concept section below. Another operational improvement is to convert all lanes at the Toll Plaza to Electronic Toll Collection (ETC), as suggested by the Metropolitan Transportation Commission (MTC) and the Contra Costa Transportation Authority (CCTA).

Segment 2

There is currently a project to add an EB Peak Period Use Lane (PPUL) on the lower deck of the RSR Bridge, as well as a WB bicycle/pedestrian path on the upper deck. Both elements are being implemented as a four-year pilot project as part of the RSR Bridge Access Improvement Project. After the four-year pilot period, they will be evaluated for future roadway configuration. While not superseding the conclusions of the evaluation, this TCR proposes to retain the PPUL as a strategy to solve EB congestion during the PM peak and recommends deferring a decision on the WB bicycle/pedestrian path until the evaluation is done. If it is decided not to keep the shared path, the available shoulder space could be converted to a PPUL as well.

Segment 3

Future concept between Sir Francis Drake Boulevard and the west end of the RSR Bridge in Segment 3 will have an additional EB lane as part of the RSR Bridge Access Improvement Project. The rest of the segment will remain a freeway with four mixed-flow lanes. New direct connectors will be added to the US 101/I-580 Interchange to address the currently missing movements from WB I-580 to southbound (SB) US 101 and from northbound (NB) US 101 to EB I-580. Ramp metering is recommended to be deployed at all freeway on-ramps and future freeway-to-freeway connectors as well.

Multimodal Concept

A more effective approach to manage freeway congestion is to promote more efficient land use and to encourage alternative modes of transportation. While land use is largely controlled by local jurisdictions, it is within Caltrans purview to accommodate non-auto modes of transportation within the State right-of-way and support off-system multimodal improvements that can benefit State facilities and further Caltrans Mission, Vision and Goals. Therefore, this TCR proposes a multimodal concept that includes:

- Exploring the possibility of further enhancing Golden Gate Transit Routes 40 and 40X and expanding the Alameda-Contra Costa Transit District (AC Transit) bus service operating within the I-580 right-of-way
- A new Park-and-Ride lot in Richmond to support the possible WB HOV lane (Central Avenue to Toll Plaza) and enhanced bus service suggested above

- Transit bypass lanes and/or transit signal priority where feasible during ramp meter development
- Supporting development of ferry service between Richmond and Larkspur
- Providing better freeway crossing facilities including overcrossings (OCs) and undercrossings (UCs) for bicycles and pedestrians at both interchange and non-interchange locations (See Tables 10 and 11)
- Supporting gap closure projects on parallel regional and local trail systems including Bay Trail and Ohlone Greenway/Richmond Greenway
- Supporting casual carpooling, ridesharing, employer shuttles and emerging transportation services/technologies

Planned, Programmed and Proposed Projects and Strategies

Tables ES 2 on page 5 lists planned and programmed projects from existing plans and programming documents, while Table ES 3 on page 6 includes proposed projects and strategies to help achieve the Corrido Concept.

Table ES 2. Planned and Programmed Projects and Strategies

Seg.	Description	Planned or Programmed	Location	Source	Project ID/EA
1, 3	Ramp Metering at I-80/I-580 connector and all on-ramps along the Corridor	Planned	ALA 47.17/ MRN 4.78	2015 RMDP*	N/A
1	Stege Drain Super Structure Rehab	Programmed	CC 1.17/1.17	2016 SHOPP**	2J720
1	Scofield UC Seismic Retrofit	Programmed	CC 5.8/5.8	2016 SHOPP	4G890
1	Replace Maintenance Building	Programmed	CC 6/6.3	BATA***	00394
1#	Bike Path on I-580 from Castro St to Toll Plaza	Programmed	CC 5.1/6.1	Local	0G570
1-3#	RSR Bridge Access Improvement	Programmed	CC 5.1/ MRN 4.8	BATA	2J680
1-3#	Shared Path on the Upper Deck of the RSR Bridge	Programmed	CC 4.8/MRN 4.8	BATA	4J710
1-2	Upgrade Electrical Substations at RSR Bridge	Programmed	CC 4.8/7.8	BATA	3G364
2	Replace Joint Seal and Related Work on RSR Bridge	Programmed	CC 6.1/7.8	BATA	3G457
2	Replace Travelers and Rails on RSR Bridge	Programmed	CC 6.1/7.8	BATA	3G474
2	Replace Air & Water Supply Lines and Install New Water Systems on Toll Bridge	Planned	CC 6.2/7.8	BATA	3G478
2	Upgrade Substations and Cable on RSR Bridge	Planned	CC 6.2/7.8	BATA	3G368
2	RSR Bridge Structural Improvements	Programmed	CC 6.2/7.8	BATA	3G460
2	RSR Bridge Structural Painting	Programmed	CC 6.3/7.7	BATA	3G484
3	Upgrade Bridge Rail at Sir Francis Drake Blvd Overcrossing and Bellam undercrossing	Programmed	MRN 3.3/3.3	2014 SHOPP	4G470
3	Re-grade Slope and Repair Down Drain near EB Off-ramp to San Quentin	Programmed	MRN 2.7/2.7	2014 SHOPP	1SS59
3	US 101/580 Interchange Direct Connector – PAED##	Planned	MRN 4.8	PBA2040	17-03-0007

* RMDP = Ramp Metering Development Plan

** SHOPP = State Highway Operation and Protection Program

*** BATA = Bay Area Toll Authority

Part of the Richmond-San Rafael Bridge Access Improvement Project, currently under construction

Project Approval/Environmental Document

Table ES 3. Proposed Projects and Strategies

Seg	Description	Location	Project Category
1	Upgrade Interchanges to Better Facilitate Bike/Pedestrian Crossing Freeway	All I-580 freeway interchanges in Richmond, especially at: <ul style="list-style-type: none"> • S 23rd Street/Marina Bay Parkway (CC R2.89) • Harbor Way South (CC R3.60) • Cutting Boulevard (CC R3.79) 	Bike/Ped
1	Implement Bike Facilities (Class II or Class III) at Non-interchange Crossing Locations	<ul style="list-style-type: none"> • Marina Way South OC (CC R3.35) • 2nd Street UC (CC R4.09) 	Bike
1	New Bike/Ped Overcrossing near S 47th Street	<ul style="list-style-type: none"> • S 47th Street (approx. CC R1.75) 	Bike/Ped
1	Support Gap Closure along Ohlone Greenway, the Richmond Greenway, and Bay Trail	Off system	Bike/Ped
1	Remove Partial Fish Passage Barrier	Cerrito Creek (ALA 48.04)	Mitigation
1	Study the Feasibility of a New Park-and-Ride Lot in Richmond	TBD	Park-and-Ride
1	Convert the Toll Plaza to All-Electronic Toll Collection	Toll Plaza (CC 6.13)	Fwy/ITS
1/2/3	Implement Additional Mainline Vehicle Detection	I-580 West mainline where vehicle detection gaps exist	Fwy/ITS
1/2/3	Capital Preventive Maintenance (CAPM)	Mainline Sections that received a Bad/Poor Ride Only grade (see Figure 5)	Fwy/Preservation
1/2/3	Support Enhanced/Expanded Transit Services between Contra Costa County and Marin County	Between BART stations in Contra Costa County to San Rafael Transit Center, Larkspur Ferry Terminal or other Marin County locations via RSR Bridge	Transit – Bus/Express Bus/BRT
1/2/3	Support New Ferry Service between Richmond Terminal and Larkspur Landing Terminal	Off-System	Transit - Ferry
1/2/3	Support Casual Carpooling, Ride Sharing and Other Emerging Technologies	Off-System	Fwy/New Tech
1/3	Implement Ramp Meters, including Transit Bypass Lane and/or Transit Signal Priority where feasible	All on-ramps, the EB I-580 to WB I-80 connector and future NB US 101 to EB I-580 and WB I-580 to SB US 101 connectors	Fwy/ITS
3	Upgrade Interchanges to better facilitate bike/pedestrian crossing freeway	I-580 freeway interchanges in Marin County: <ul style="list-style-type: none"> • Main Street/San Quentin (MRN 2.63) • Bellam Boulevard (MRN 4.50) 	Bike/Ped

CORRIDOR OVERVIEW

ROUTE SEGMENTATION

For the purpose of this TCR, the Corridor is divided into three segments as shown in Table 1 and Figure 1.

Table 1. I-580 West Route Segmentation

Segment #	Location Description	County_Route_ Beg. PM	County_Route_ End PM
1	I-80/I-580 North Split to Toll Plaza	ALA_580_R47.17	CC_580_6.13
2	Toll Plaza to West End of Richmond San Rafael Bridge	CC_580_6.13	MRN_580_2.48
3	West End of Richmond San Rafael Bridge to US 101	MRN_580_2.48	MRN_580_4.78

Figure 1. I-580 West Route Segmentation Map



ROUTE DESCRIPTION

I-580 is a freeway running east-west starting at I-5 in San Joaquin County in Caltrans District 10. The route enters District 4 in Alameda County near the I-580/I-205 interchange. It continues through Alameda and Contra Costa Counties and terminates at US 101 in Marin County. Due to its length and complexity, District 4 divided the route into four legs and developed a corridor planning document for each leg. Table 2 lists these four documents.

Table 2. I-580 Planning Documents in District 4

	Corridor Limits	Document
1	SJ/ALA County Line to I-238	I-580 East CSMP
2	I-238 to I-80/I-580/I-880 Distribution Structure	I-580 Central TCR
3	I-80/I-580/I-880 Distribution Structure to I-80/I-580 North Split*	I-80 West CSMP
4	I-80/I-580 North Split to US 101	I-580 West TCR

* Leg 3 is dual-signed and listed under I-80 on Caltrans Highway Sequence Listing¹

This TCR covers the most western and final leg of the route. The I-580 West Corridor runs in a northwest/west direction for approximately 13.4 miles through three counties. The Corridor begins at the I-80/I-580 north split in the City of Albany in Alameda County. It then enters Contra Costa County and travels through the City of Richmond before crossing the RSR Bridge. After the Bridge, the Corridor continues northwest in the City of San Rafael in Marin County ending at US 101.

Between Contra Costa County at Post Mile (PM) 6.22 and Marin County at PM 2.48, I-580 crosses the San Francisco Bay/San Pablo Bay over the RSR Bridge. The Bridge, built in 1956, measures 5.5-miles long (including approaches) and features two identical cantilever spans, giving it a roller coaster appearance. I-580 between the I-80/I-580 split and the I-580/US 101 Interchange is officially named the John T. Knox Freeway.

In 1998 Caltrans developed the first Interregional Transportation Strategic Plan (ITSP) recommending improvements to the Interregional Road System (IRRS). The 1998 ITSP identifies I-580 as one of the IRRS High Emphasis Routes, which have high interregional importance from a State perspective. These routes receive top priority for projects to be programmed and constructed to at least the minimum facility-concept standard (for most routes, this is freeway or expressway). In 2015, Caltrans updated the ITSP and replaced the High Emphasis and Focus Route designations with the identification of eleven multimodal Strategic Interregional Corridors that connect major geographic regions of the State. I-580 West has been designated as a Priority Interregional Highways within the San Jose/San Francisco Bay Area – Sacramento – Northern Nevada Corridor.



I-580 West is functionally classified as an Interstate Freeway on the California Road System², and is also designated as part of the Strategic Highway Network (STRAHNET) for emergency response planning. The STRAHNET, created and administered by the U.S. Department of Defense, is a nationwide system of highways within the National Highway System that may be used to transport personnel and equipment in emergencies.³

The I-580 West Corridor is also part of the National Network for trucking, defined by the federal Surface Transportation Assistance Act of 1982 (STAA). See Freight section for more information.

¹ <http://onramp.dot.ca.gov/tsi/ohsip/tasas/sequencelisting/district04.pdf>

² California Road System (CRS) Maps, http://www.dot.ca.gov/hq/tsip/hseb/crs_maps/

³ National Highway System, http://www.fhwa.dot.gov/planning/national_highway_system/

Table 3. Route Description by Segment

Segment #	1	2	3
Freeway & Expressway	Yes	Yes	Yes
National Highway System	Yes	Yes	Yes
Strategic Highway Network	Yes	Yes	Yes
Scenic Highway	No	No	No
Interregional Road System	Yes	Yes	Yes
Federal Functional Classification	Interstate	Interstate	Interstate
Goods Movement Route	Yes	Yes	Yes
Truck Designation	National Network	National Network	National Network
Rural/Urban/Urbanized	Urbanized	Urbanized	Urbanized
Metropolitan Planning Organization	MTC	MTC	MTC
Regional Transportation Planning Agency	MTC	MTC	MTC
Congestion Management Agency (CMA) [#]	Alameda CTC*/CCTA	CCTA/TAM**	TAM
Local Agency	City of Albany/ City of Richmond	City of Richmond/Marin County	City of San Rafael
Tribes	N/A	N/A	N/A
Air District	BAAQMD***	BAAQMD	BAAQMD
Terrain	Flat	Flat	Flat

Caltrans works with CMAs on system monitoring and planning for system improvements

* Alameda County Transportation Commission

** Transportation Authority of Marin

*** The Bay Area Air Quality Management District

COMMUNITY CHARACTERISTICS

I-580 West traverses three cities in three counties: Albany in Alameda County, Richmond in Contra Costa County, and San Rafael in Marin County.

Albany

During the California Gold Rush era Albany was a manufacturing center for dynamite used in the goldfields of the Sierra Nevada. Numerous powder plants were located at Fleming Point. Today Albany is a vibrant community with many businesses and recreational opportunities. The most notable trip generator is the Golden Gate Fields, a horse racing facility straddling the cities of Albany and Berkeley.

Richmond

Richmond is the largest community along the I-580 West Corridor. Many industries have been and are still sited in Richmond. It had a dynamite and gunpowder works. During World War II, Richmond developed rapidly as a heavy industrial town, chiefly devoted to shipbuilding. Its major activity now is as a seaport, with 24.1 million tons of goods shipped through Port Richmond, commodities include bulk liquids, dry bulk materials, metals, vehicles, and break-bulk cargo. Rail tracks serving the Port travels through South Richmond and freight trains can block I-580 access to/from the area. The Marina Bay Parkway Grade Separation Project that was open in December 2015 helped alleviate this problem. See page 32 for more information.

Chevron Richmond Refinery, owned and operated by Chevron Corporation, employs more than 1,200 workers, making it the city's largest employer. I-580 provides access to the refinery at Castro Street and Western Drive.

Kaiser Permanente Richmond Medical Center, one of four Kaiser Permanente medical centers serving the East Bay, is located in Central Richmond, approximately one-mile north of I-580 along Harbor Way.

San Rafael

San Rafael is the westernmost city along the I-580 West Corridor. There are a large number of high tech firms located in the city, including Lucas Films, among other video game developers. Kaiser Permanente has a hospital in San Rafael and is currently the city's largest employer. The Canal neighborhood, located between US 101/I-580 and the San Rafael Canal, is the highest density area and neighborhood with the highest transit ridership in Marin County.

Table 4. Demographics for Albany, Richmond and San Rafael⁴

	2010 U.S. Census			American Community Survey 2006-2010		
	Population	Housing Units	Average Household Size	Median Household Income	Mean Travel time to Work (Min)	Percentage of Workers Driving alone to Work
Albany	18,539	7,889	2.49	\$71,994	29.1	53.0%
Richmond	103,701	39,328	2.83	\$54,012	31.8	62.5%
San Rafael	57,713	24,011	2.44	\$72,326	25.1	74.4%
Bay Area	7,1501,739	2,785,948	2.69	\$75,989*	27.3*	67.4%

* Including Santa Cruz and San Benito Counties

The cities of Albany and San Rafael are similar in average household size and median household income and represent Bay Area averages more closely than Richmond. Richmond is the largest city of the three with noticeably larger household size and lower median household income. When it comes to commute to work, however, Richmond and Albany are more similar. Compared to San Rafael and the Bay Area averages, both cities have higher mean travel time to work and lower percentage of workers commuting in single-occupancy vehicles.

Unincorporated Area

In addition to these three cities, the I-580 West Corridor also traverses an unincorporated area in Marin County where San Quentin State Prison is located. San Quentin State Prison is a California Department of Corrections and Rehabilitation State Prison for men. Opened in July 1852, it is the oldest prison in the state. California's only death row for male inmates, the largest in the United States, is located at the prison.

LAND USE

The I-580 West Corridor traverses one of the most densely populated regions of the Bay Area. Land use surrounding the Corridor includes a mix of residential, commercial, industrial and institutional uses, as well as open space and major trip generators identified in the Community Characteristics section above.

In developing Plan Bay Area (PBA) 2040, the Bay Area's next Regional Transportation Plan (RTP), MTC adopted a Final Preferred Scenario (FPS) in November 2016 to be carried forward for environmental impact analysis. The FPS includes jurisdiction level household and employment forecast. Table 5 shows household and employment

⁴ <http://www.bayareacensus.ca.gov/index.html>

growth in cities along the Corridor. While Richmond is forecasted to have the largest household growth at 52 percent, most household growth will occur within Priority Development Areas (PDAs) designated by each city, with Richmond and El Cerrito almost tripling the number of households within their respective PDAs by 2040. Employment growth along the Corridor is forecasted to concentrate in Richmond. Both Richmond and Albany will have faster employment growth than household growth, which may help these cities achieve improved job-housing balance and reduce commute travel needs.

Table 5. Household and Employment Growth Forecast⁵

Jurisdiction	Summary Level	Households 2010	Households Forecast 2040	Household Growth %	Employment 2010	Employment Forecast 2040	Employment Growth %
Albany	Total	7,401	7,850	6	4,420	5,190	17
	PDA	320	470	47	2,160	2,230	3
Richmond	Total	36,093	54,900	52	30,680	61,800	101
	PDA	8,360	24,000	187	13,370	35,300	164
El Cerrito*	Total	10,142	12,100	19	5,320	5,910	11
	PDA	740	2,150	191	3,800	4,060	7
San Rafael	Total	22,764	25,550	12	43,430	49,000	13
	PDA	1,670	2,560	53	9,070	10,020	10
Larkspur*	Total	5,908	6,420	9	7,500	7,670	2
	PDA (None)	n/a	n/a	n/a	n/a	n/a	n/a

* El Cerrito and Larkspur are included for reference due to their proximity to the I-580 West Corridor

The University of California, Berkeley (UC Berkeley) adopted a Long Range Development Plan (LRDP) in May 2014 that proposes to join together with the Lawrence Berkeley National Laboratory (LBNL) to establish a new research campus, the Richmond Bay Campus. This new campus will replace and expand the existing Richmond Field Station, located directly south of the I-580/Regatta Boulevard Interchange. When fully implemented, the new campus would represent the largest growth in the Corridor. As of August 25, 2016, however, UC Berkeley has indefinitely suspended the plan to build the Richmond Bay Campus due to budgetary challenges.⁶

Priority Development Areas and Priority Conservation Areas

PBA 2013, approved in 2013, is a long-range integrated transportation and land-use/housing strategy and serves as the current RTP for the San Francisco Bay Area. PBA responds to Senate Bill 375 (2008) which requires metropolitan regions in the State to develop a Sustainable Communities Strategy (SCS) to accommodate future population growth while reducing greenhouse gas emissions from cars and light trucks. The identification and establishment of local PDAs will help focus 80 percent of new housing and 66 percent of new jobs forecast for the region. Priority Conservation Areas (PCA) were developed simultaneously for existing parks and open space as well as other areas that need protection from further development. The Plan is currently being updated, as noted on the previous page.

PDAs are locally designated areas within existing communities that have been identified and approved by local cities or counties for future growth. These areas are typically more accessible to transit, jobs, shopping and other services. PCA are areas identified through consensus by local jurisdictions and park/open space districts as lands in need of protection due to pressure from urban development or other factors. MTC produced the RTP in concert with the Association of Bay Area Governments (ABAG) which is responsible for developing regional housing and employment forecasts. Within the Plan's horizon year (2040), population estimates for the Bay Area include two million new residents and a total population topping nine million. The next update, called Plan Bay Area 2040, is

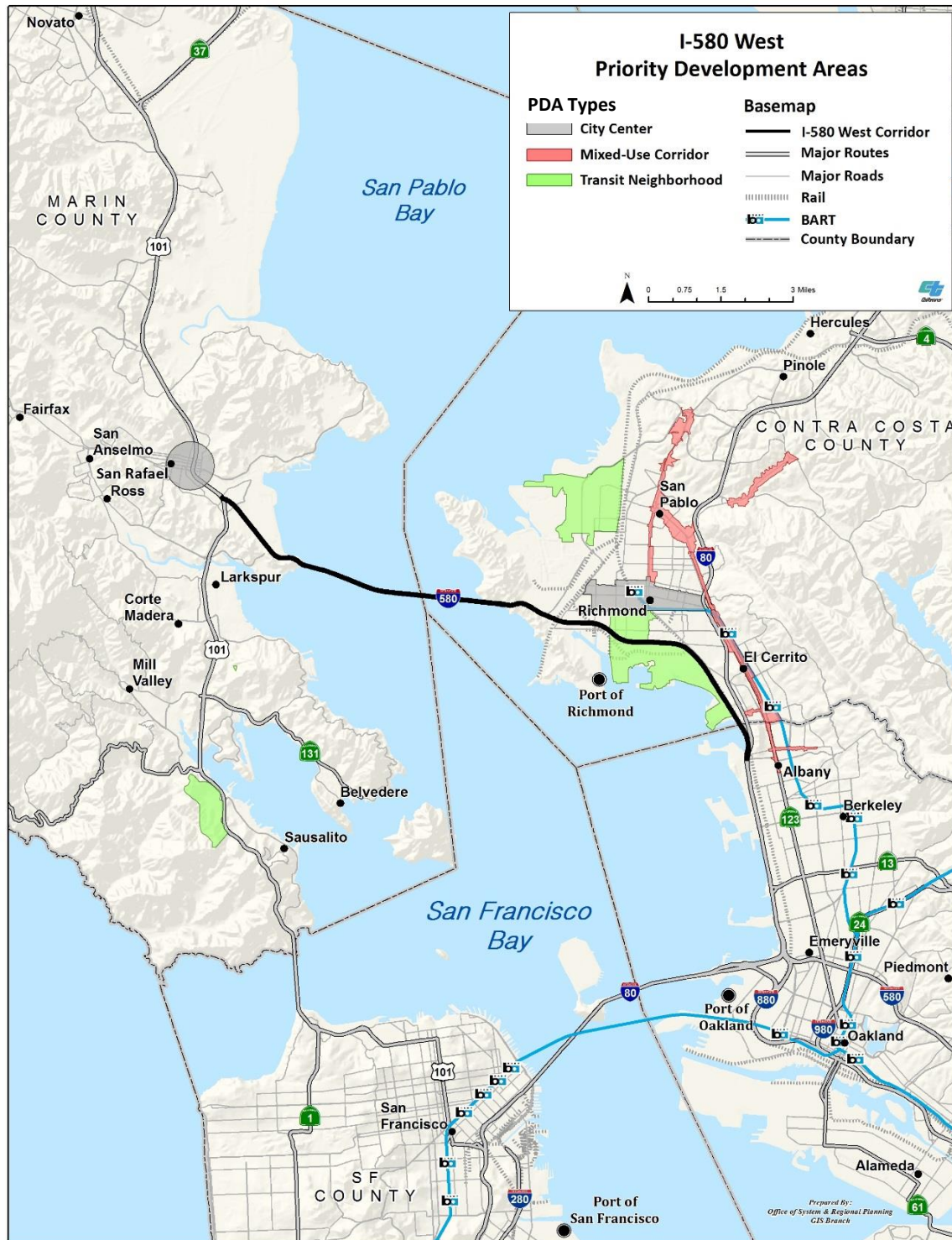
⁵ Distribution of 2040 Household and Employment Forecasts, Plan Bay Area 2040 Final Preferred Scenario, November 9, 2016

⁶ <http://news.berkeley.edu/2016/08/26/statement-on-the-richmond-bay-campus/>

now underway and scheduled for adoption in 2017. Figure 2 displays where these PDAs and PCAs are located along I-980.

See Figure 2 below for the locations of the PDAs along I-580. PCA locations are shown on Figure 13 in the Environmental Considerations section. PDAs along the I-580 West Corridor include San Pablo and Solano Mixed Use Neighborhood in Albany, San Pablo Avenue Corridor in Richmond and El Cerrito, South Richmond, downtown Richmond, and downtown San Rafael.

Figure 2. Priority Development Areas along the I-580 West Corridor



Complete Streets

A Complete Street is defined as a transportation facility that is planned, designed, operated, and maintained to provide safe mobility for all users including bicyclists, pedestrians, transit vehicles, trucks, and motorists, appropriate to the function and context of the facility. Complete Streets concepts apply to rural, suburban, and urban areas. Providing Complete Streets increases travel options which in turn can reduce congestion, increase system efficiency, and enable more environmentally sustainable alternatives to single driver automotive trips.

Implementing Complete Streets and other multi-modal concepts supports the California Complete Streets Act of 2008 (AB 1358), as well as the California Global Warming Solutions Act of 2006 (AB 32), Senate Bill (SB) 375 and SB 391, which outline the State's role in reducing greenhouse gas emissions through Sustainable Communities Strategies (SCS). In support of Complete Streets, Caltrans Deputy Directive 64-Revision 1 (DD-64-R2) provides for the needs of travelers of all ages and abilities in all planning, programming, design, construction, operations, and maintenance activities on the State Highway System. Caltrans views all transportation improvements (new and retrofit) as opportunities to improve safety, access, and mobility for all travelers and recognizes bicycle, pedestrian, and transit modes as integral elements of the transportation system. With AB 1358, DD-64-R2, and the endorsement of the National Association of City Transportation Officials (NACTO) Urban Design guidelines both Caltrans and local agencies are working to address common goals.

MTC's One Bay Area Grant (OBAG) Program requires participating agencies to adopt resolutions which incorporate (MTC) Complete Streets elements and modify their general plans to comply with the California Complete Streets Act. Agencies are encouraged to consult with internal departments as well as stakeholders and to go beyond the required elements to accommodate all users of the roadway network. Language in the elements is kept general to allow jurisdictions the flexibility they need to develop their own policy.

California Transportation Plan

Senate Bill 391 (SB 391) of 2009 requires Caltrans to update the California Transportation Plan (CTP) by December 31, 2015 and every five years thereafter. The CTP shall identify the integrated multimodal transportation system needed to achieve maximum feasible greenhouse gas emissions reductions to 1990 levels by 2050 and 80 percent below 1990 levels by 2050 (as required by AB 32). In addition, SB 391 requires the CTP to incorporate transportation policies and system performance objectives from approved Regional Transportation Plans produced by the MPOs. Caltrans must also consult, coordinate, and make drafts of the CTP available for review and comment to the: California Transportation Commission, Strategic Growth Council, State Air Resources Board, State Energy Resources Conservation and Development Commission, Air Quality Management Districts, public transit operators, Regional Transportation Planning Agencies, MPOs and other interested parties. The current CTP was adopted in June 2016.

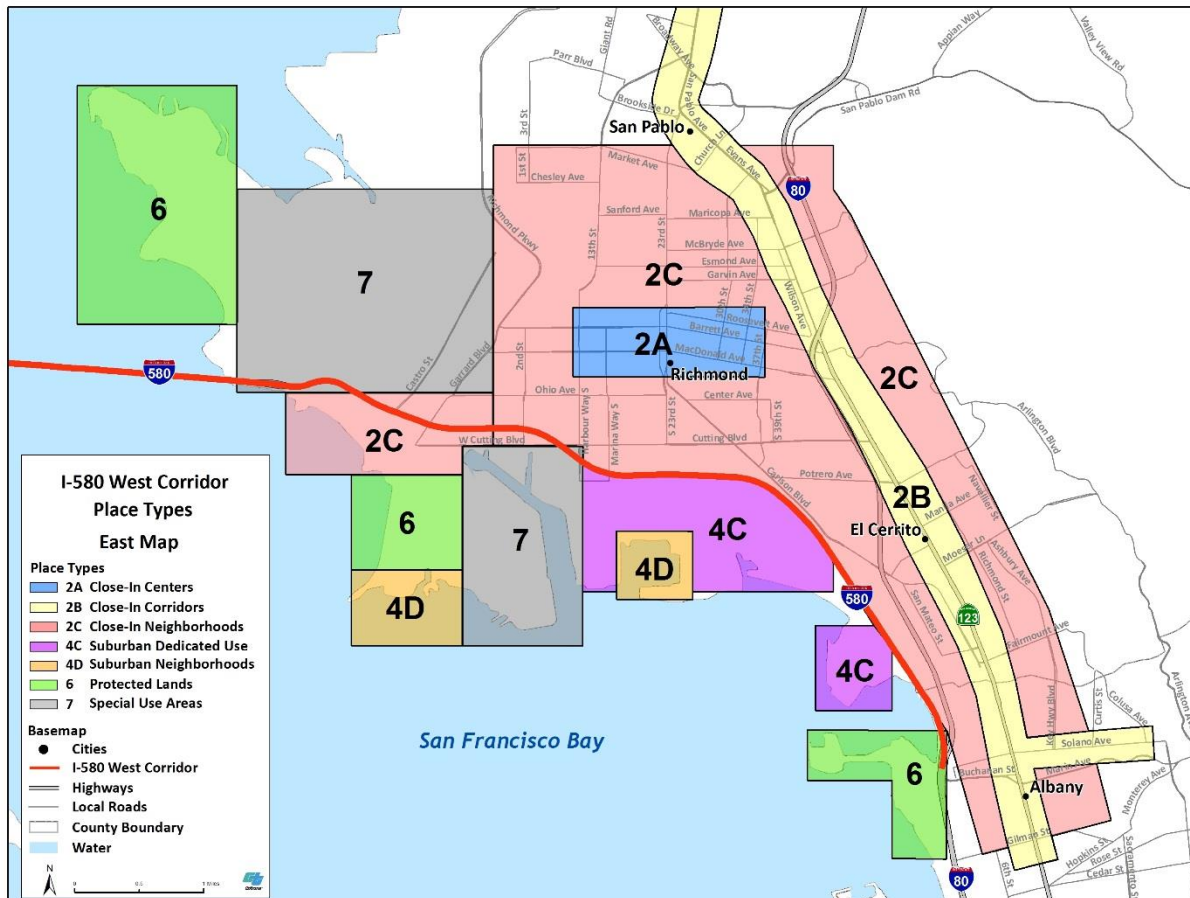


Smart Mobility Framework

In 2010, Caltrans introduced the concept of Smart Mobility through establishment of the Smart Mobility Framework (SMF). The SMF is a Transportation Planning guide that includes the notion of place types to further integrate smart growth concepts into transportation and land use development. The goal of this framework is to serve as a guide and assessment tool for determining how well plans, programs, and projects meet the definition of "smart mobility" and ensure applicability of the framework for both Caltrans as well as partner agencies. Location Efficiency of a place type is measured and ranked based on its Community Design characteristics and Regional Access to the transportation system.

Place Types help planners determine transportation needs. By identifying what kind of built environment is most prevalent along a State highway corridor, the interrelated challenges of mobility and sustainability in specific areas can become clearer. The analysis is based on Caltrans Mission and Goals. Once likely transportation, development and conservation investment strategies are identified, a Place Type Location Efficiency factor can be applied and further smart mobility benefits can be realized in the future. Figure 3 shows the place types along the Corridor and Table 6 identifies some potential transportation programs/projects for each of these place types.

Figure 3. I-580 West Smart Mobility Framework Place Types



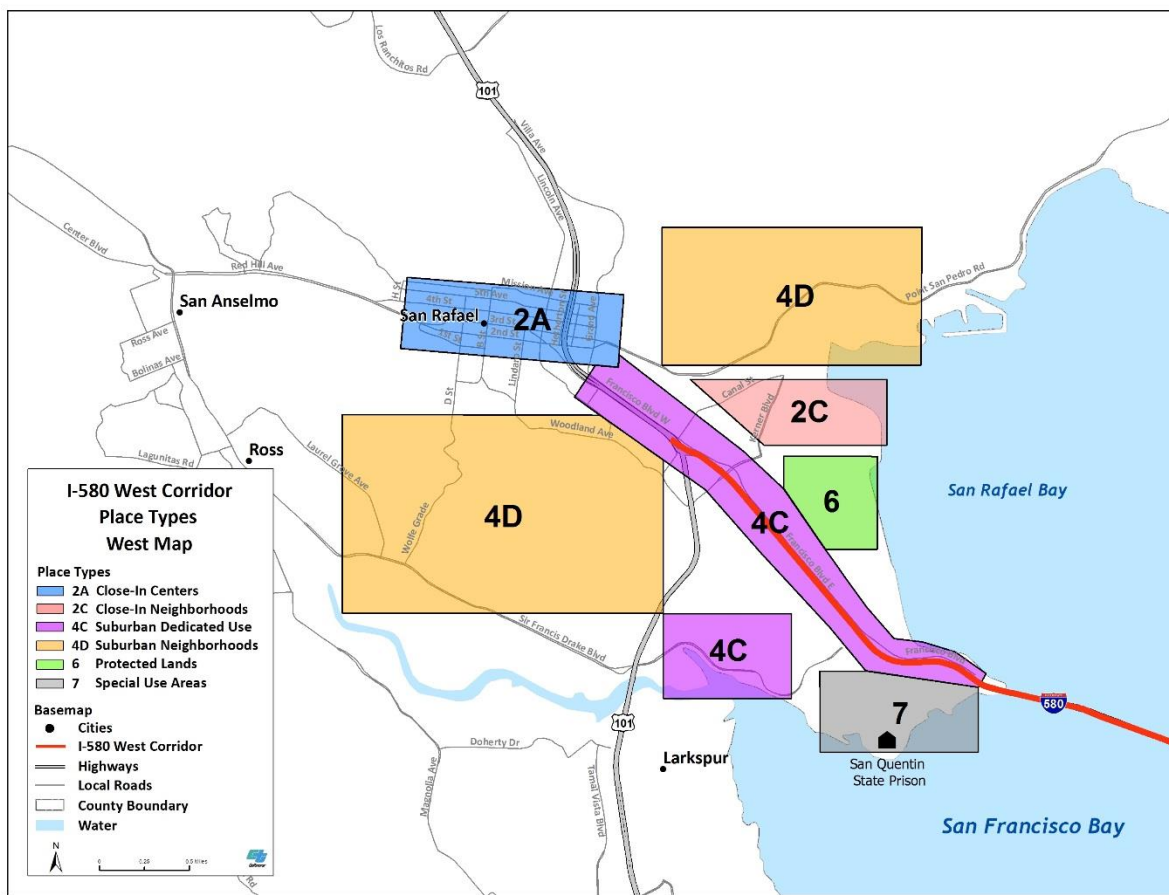


Table 6. Smart Mobility Framework Place Type by Segment⁷

Segment	Place Type	Transportation Programs and Projects
1	2A. Close-in Centers	<ul style="list-style-type: none"> Complete streets projects Reliability and efficiency measures to optimize use of street and freeway capacity Street network connectivity projects Ongoing re-investment in existing facilities Local transit with excellent coverage providing connections to high capacity transit lines. Investments that improve operational efficiency of existing arterials Connectivity improvements leading to shorter trip lengths and increased non-auto mode share Investments in Complete Streets Commute transit service and rideshare promotion where concentrated employment centers are present Capacity and connectivity increase only when required Bicycle facility and trail projects where public access and recreational use is permitted
	2B. Close-in Corridors	
	2C. Close-in Neighborhoods	
	4C. Suburban – Dedicated Use Areas	
	4D. Suburban – Neighborhoods	
	6. Protected Lands	
	7. Special Use Areas	
2	N/A	N/A
3	2A. Close-in Centers	See Segment 1
	2C. Close-in Neighborhoods	
	4C. Suburban – Dedicated Use Areas	
	4D. Suburban – Neighborhoods	
	6. Protected Lands	
	7. Special Use Areas	

⁷ http://www.dot.ca.gov/hq/tpp/offices/ocp/documents/smf_files/SMF_handbook_062210.pdf

SYSTEM CHARACTERISTICS

The I-580 West Corridor is approximately 13.4 miles in length. The route provides interregional connectivity to the North Bay (San Rafael and points north) from the Richmond–Albany–El Cerrito area. The number of lanes range from four to six over the length of the corridor. The RSR Bridge, a vital feature of the Corridor, is one of the seven State-owned toll bridges. Toll is collected in the WB direction only. MTC/the Bay Area Toll Authority (BATA) is currently conducting the Toll Plaza Operational Improvement study for all State-owned toll bridges to evaluate the feasibility of converting some or all toll plazas to all-electronic toll collection. Table 7 lists lane use configuration approaching and at the Toll Plaza.

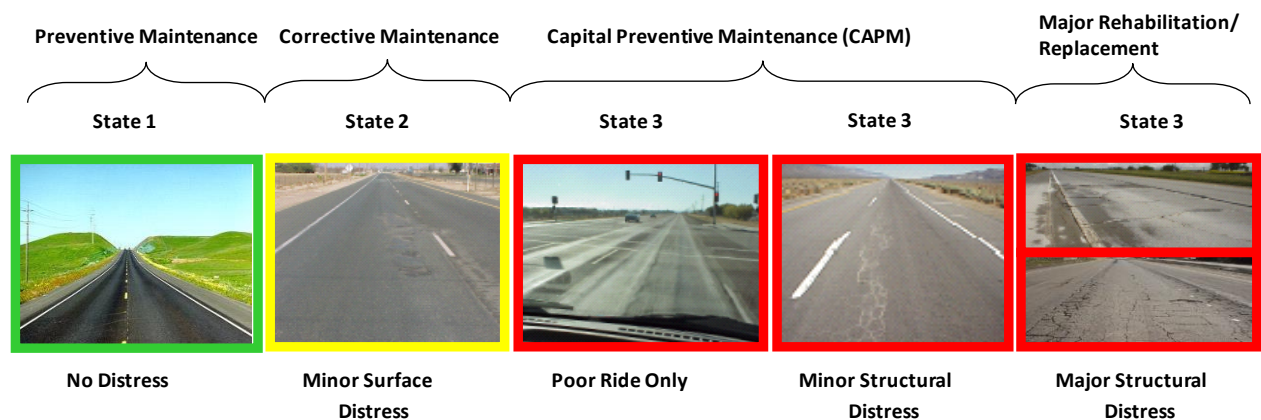
Table 7. Lane Use Configuration approaching and at the Toll Plaza

Lane #	Peak Periods	Other Periods
WB I-580 approaching the Toll Plaza		
1	HOV or FasTrak only	FasTrak only
2	FasTrak only	
3	Cash and FasTrak	Cash and FasTrak
At the Toll Plaza		
1	HOV	FasTrak only
2-3	FasTrak Only	
4-7	Cash and FasTrak	Cash and FasTrak

Auxiliary lanes are found between most consecutive interchanges in Segments 1 and 3. The EB auxiliary lane between Sir Francis Drake Boulevard and Main Street will be converted to a mixed-flow lane as part of the RSR Bridge Access Improvement Project, described in the Freeway Performance section on page 38.

Table 8 on the next page summarizes the existing and future system characteristics for I-580 West. There are limited mainline detection stations within the Corridor, so additional detection will be needed. According to 2013-2015 pavement conditions data, a significant portion of I-580 West received a “Bad Ride/Poor Ride Only” quality grade, although no structural distress was present. As indicated in Figure 4 below, Poor Ride Only represents the third state of pavement distress level. The corresponding treatment is called Capital Preventive Maintenance (CAPM), which should be applied to affected sections on I-580 West. Figure 5 shows where these sections are located.

Figure 4. Pavement Distress Level and Corresponding Treatment



State 1: Good/excellent condition with few potholes or cracks ⇒ Preventive maintenance project

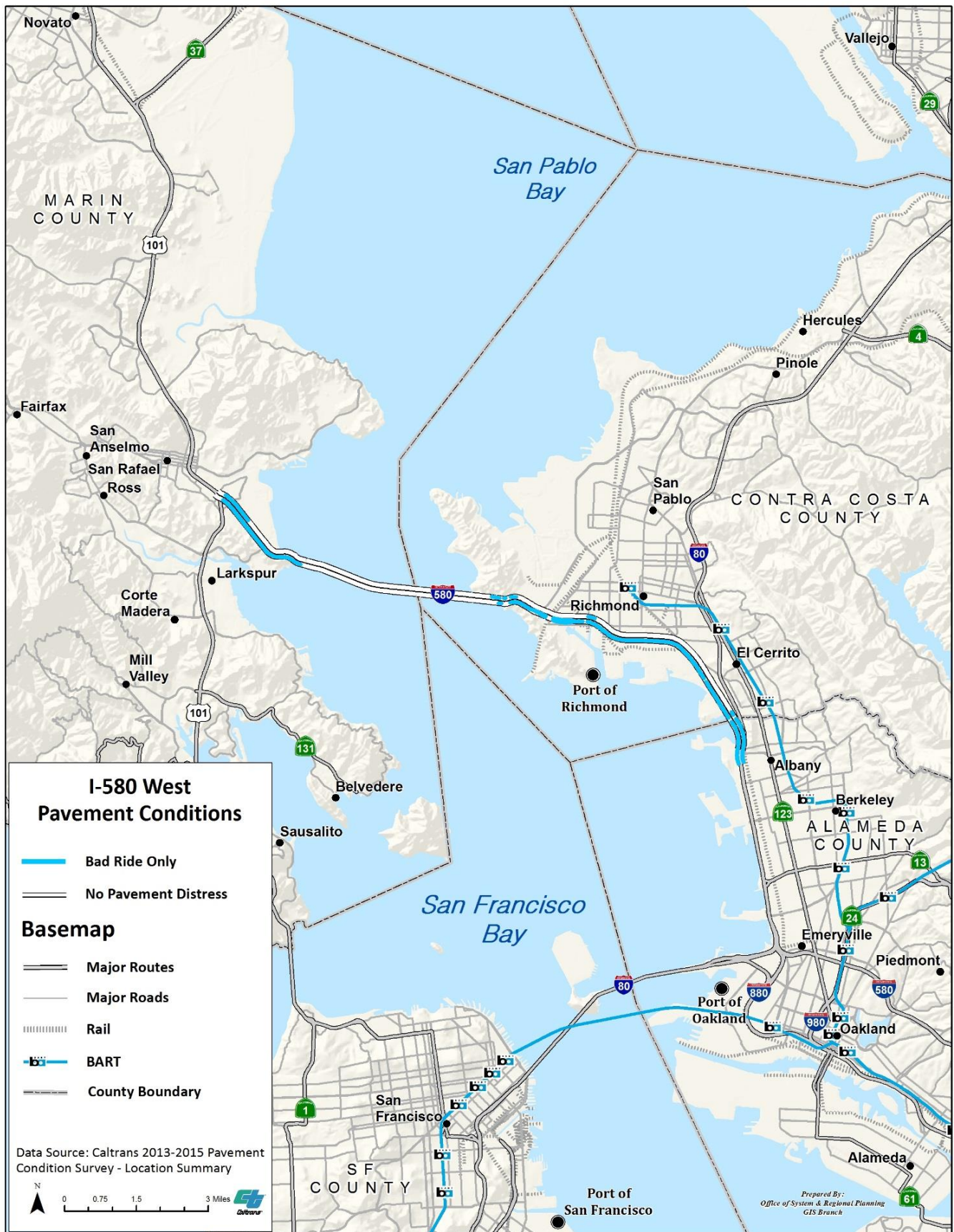
State 2: Fair condition with minor cracking or slab cracking ⇒ Corrective maintenance project

State 3: Poor condition with significant to extensive cracks or poor ride only ⇒ CAPM, rehabilitation or reconstruction project

Table 8. Existing and Future System Characteristics

Segment #	1	2	3
Existing Facility			
Facility Type	Freeway	Freeway	Freeway
General Purpose Lanes	5-6	4	4
Lane Miles	40.33	16.55	9.22
Centerline Miles	6.95	4.14	2.31
Median Width	10-30 ft	N/A	10-34 ft
Median Characteristics	Paved, Concrete Barrier	WB upper deck, EB lower deck	Paved, Concrete Barrier
HOV Lanes	0	0 (except at Toll Plaza)	0
HOT/Express Lanes	0	0	0
Toll Lanes	0	2	0
BRT Lanes	0	0	0
Auxiliary Lanes	Yes	N/A	Yes
Truck Climbing Lanes	No	No	No
Distressed Pavement	See Figure 4		
Current Right-of-Way	53-150 ft	36 ft	58-107 ft
Concept Facility			
Facility Type	F	F	F
General Purpose Lanes	5-6	4	4-5
Lane Miles	40.90	20.69	9.92
Centerline Miles	6.95	4.14	2.31
HOV/Transit Only Lanes	0	see Concept	0
HOT/Express Lanes	0	See Concept	0
Toll Lanes	0	2	0
Aux Lanes	Yes	N/A	Yes
Truck Climbing Lanes	No	No	No
Traffic Management System Elements			
TMS Elements (2014)	<ul style="list-style-type: none"> • Mainline Detection • Fwy Ramp Meters • CCTVs • CMS's 	<ul style="list-style-type: none"> • CCTVs 	<ul style="list-style-type: none"> • Mainline Detection • Fwy Ramp Meters • Fwy-to-Fwy Connector Ramp Meters • CCTVs
TMS Elements (2040)	<ul style="list-style-type: none"> • Mainline Detection • Fwy Ramp Meters • Fwy-to-Fwy Connector Ramp Meters • CCTVs • CMSs 	<ul style="list-style-type: none"> • CCTVs • Mainline Detection 	<ul style="list-style-type: none"> • Mainline Detection • Fwy Ramp Meters • Fwy-to-Fwy Connector Ramp Meters • CCTVs • CMSs

Figure 5. 2013-2015 Pavement Conditions



BICYCLE FACILITY

Bicycle facilities within the I-580 West Corridor can be divided into three categories: on-system facilities, freeway crossings, and parallel facilities. A gap analysis is also included to identify potential areas for improvement.

On-system Facilities

Bicycle access on I-580 West is mostly prohibited with two exceptions, where bikes are allowed on outside shoulders of the freeway. Table 9 lists these locations. Bikes are not allowed on the RSR Bridge. However, a project is currently under development to add a bi-directional bike path on the upper deck and to reconfigure existing bicycle facilities on approaches to the bridge. See RSR Bridge Access Improvement Project on page 37.



Bicycle is allowed on WB shoulder between Marine St and Stenmark Dr

Table 9. Locations Where Bicycle Access is Permitted

Seg	State Bicycle Facility								
	Seg ID	Direction	Post Mile	Location Description	Bicycle Access Prohibited	Facility Type	Outside Paved Shoulder Width	Facility Description	Posted Speed Limit
1	A	WB	CC 5.43 – CC 6.00	Marine St to Stenmark Drive off-ramp	No	Class I transitioning to Class III on Freeway Outside Shoulder	>8 ft	Access from Marine St U/C	55mph
	B	EB	CC6.13 – CC 5.56	Toll Plaza to Marine St off-ramp	No	Class I transitioning to Class III on Freeway Outside Shoulder	>8 ft	Access from trail U/C west of the Toll Plaza	55mph
2	N/A								
3	C	WB	MRN 3.09	Sir Francis Drake Blvd off-ramp	No	Class III on Off-ramp	>8 ft	Access from Francisco Blvd E	45mph (Advisory)
	D	EB	MRN 3.18 – MRN 2.82	Sir Francis Drake Blvd on-ramp to Main St off-ramp	No	Class III on Freeway Outside Shoulder	>8 ft	Access from Sir Francis Drake Blvd	55mph

Freeway Crossings

Freeways often divide up communities and create barriers for bicycle and pedestrian movements. As a result, freeway interchanges and non-interchange over- and under-crossings are critical in providing a well-connected bike/pedestrian network. Table 10 summarizes the freeway crossing opportunities along I-580 West.

Table 10. Crossing Opportunities for Bicycles

Segment	PM	Location	Interchange?	Facility Type	Comments
1 ALA R47.171 – CC 6.125	ALA R47.31	Buchanan St UC	Yes	Class I	Class I shared path north of Buchanan St
	CC 0.27	Central Ave OC	Yes	Class II	
	CC 1.21	Bayview Ave OC	Yes	Bikes Allowed	
	CC R 2.09	Regatta Blvd OC	Yes	Bikes Allowed	Regatta Blvd breaks. Class II bike lanes available on the non-crossing leg west of Meade St
	CC R 2.89	S. 23 rd St/Marina Bay Pkwy OC	Yes	Bikes Allowed	Class II bike lanes end at Cutting Blvd north of freeway
	CC R 3.35	Marina Way OC	No	Bikes Allowed	Class III bike route ends at Wright Ave south of freeway
	CC R 3.60	Harbour Way OC	Yes	Bikes Allowed	Class III bike route ends at Hoffman Blvd/EB on-ramp south of freeway
	CC R 3.79	Cutting Blvd OC	Yes	Bikes Allowed	Class II bike lanes end at EB off-ramp/Hoffman Blvd west of freeway
	CC R 4.09	S. 2 nd St UC	No	Bikes Allowed	
	CC R 4.64	Canal Blvd UC	Yes	Bikes Allowed	Class II bike lanes end at W Cutting Blvd south of freeway
	CC R 4.85	S. Garrard Blvd UC	No	Class II	
	CC R 5.11	Castro St UC	Yes	Bikes Allowed	
	CC R 5.43	Marine St UC	Yes	Bikes Allowed	Class I bike path also available west of Marine St that leads to Class III bike route on westbound freeway shoulder
	CC 5.80	Western Ave UC	No	Private Road	
	CC 6.13	Toll Plaza UC	Yes	Class I	Located west of the Toll Plaza. Leading to Class III bike route on eastbound freeway shoulder
3 MRN 2.477 – MRN 4.782	MRN 2.63	Main St/San Quentin UC	Yes	Bikes Allowed	Class III bike route ends at EB ramps
	MRN 3.29	Sir Francis Drake OC	Yes	Class II	Westbound movement only, accessible from Francisco Blvd E to WB off-ramp
	MRN 4.50	Bellam Blvd UC	Yes	Class III	Class III bike route crosses the I/C and transitions into Class II bike lanes southwest of freeway

Parallel Facilities

Local arterials and trails located within the vicinity of and running parallel to a freeway provide a good alternative for bicycle travel. A continuous parallel facility, either a single trail or a network of streets and trails, helps reduce vehicular demand on the freeway. There are two sets of parallel systems located within a one-mile buffer zone from I-580 West. Together, they provide over seven miles of paved path parallel to I-580 for bicycle and pedestrian travel. Figure 6 shows the location of parallel bicycle facilities.

1. Bay Trail

Senate Bill 100, passed into law in 1987 directed ABAG to develop an alignment for the Bay Trail as well as funding and implementation plans. When complete, the Bay Trail will be a continuous 500-mile recreational corridor that

will encircle the entire Bay Area. To date, approximately 338 miles of the alignment have been completed, including a series on Class I, II and III facilities.

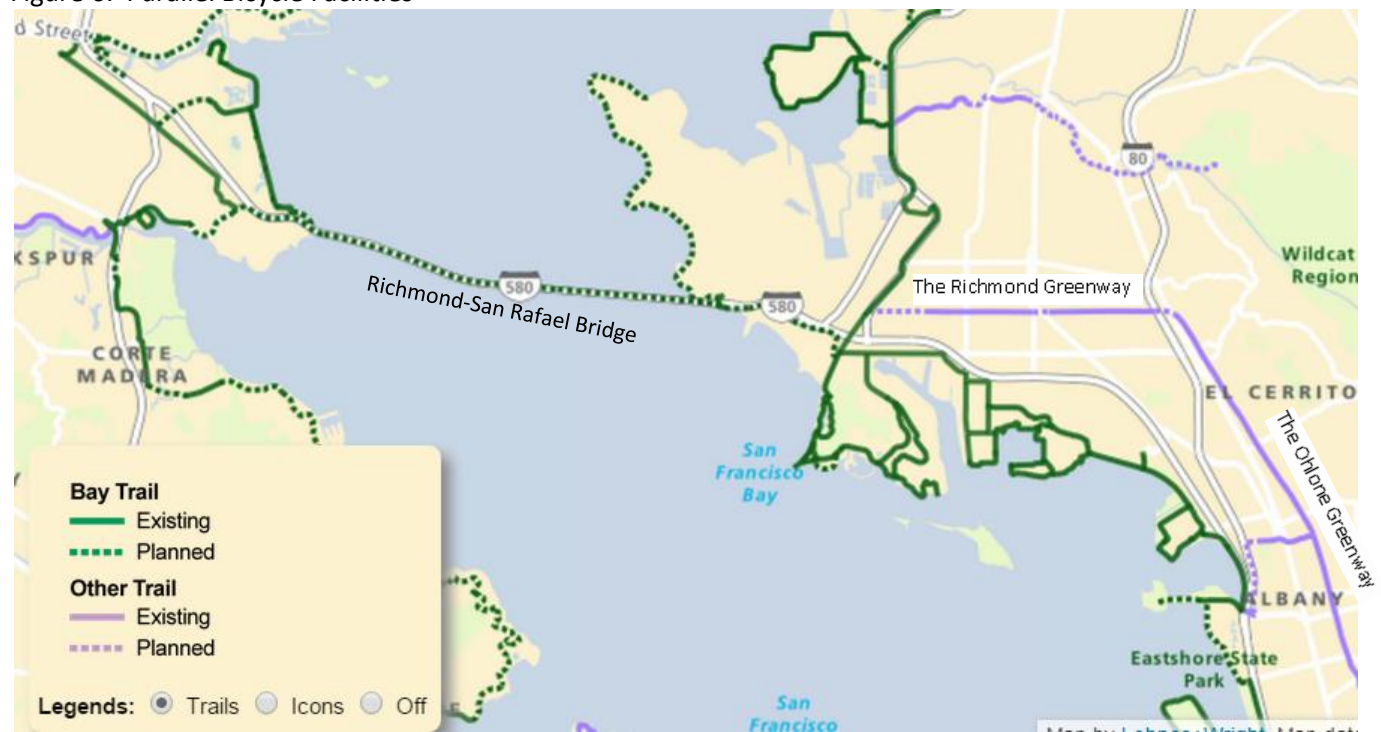
On the Contra Costa County side, the Bay Trail mainly follows the shoreline as a shared path while also utilizing the local arterial network for connection. It connects Golden Gate Fields Racetrack, Point Isabel Shoreline Park, the UC Berkeley Richmond Field Station, Richmond's Marina Bay Neighborhood, the Port of Richmond, and Point Richmond. On the Marin County side, the Bay Trail includes a shared path along the shoreline north/east of the freeway and Class II bike lanes along Anderson Drive, located south/west of the freeway.

2. Ohlone Greenway and Richmond Greenway

Beginning at Ohlone Park in Berkeley, the Ohlone Greenway traverses the cities of Albany and El Cerrito before connecting to the Richmond Greenway near MacDonald Avenue/San Pablo Avenue in Richmond. It runs roughly parallel to I-80 and I-580 and along the BART alignment in a northwest direction, providing access to three BART stations: North Berkeley, El Cerrito Plaza and El Cerrito del Norte. For most part, the Ohlone Greenway is a Class I shared path for bicyclists and pedestrians.

The Richmond Greenway is a Class I shared path that runs parallel on the north side of I-580. It begins at the Ohlone Greenway, travels westerly along the former Santa Fe Railroad right-of-way and ends near the Point Richmond neighborhood. The City of El Cerrito currently has a Safe Routes to Transit planning grant for design of the connection between the two Greenways. There is also plan to extend the Richmond greenway farther west to connect to the Bay Trail along Richmond Parkway.

Figure 6. Parallel Bicycle Facilities



Source: San Francisco Bay Trail Project⁸

Gap Analysis

The most obvious gap along the I-580 West Corridor is the lack of bicycle facilities on the RSR Bridge. Currently, bicyclists have to rely on Golden Gate Transit Route 40/40X (See Transit section) to transport their bikes across

⁸ <http://www.baytrail.org/maps.html>

the bridge. Caltrans is working with BATA, CCTA and the Transportation Authority of Marin (TAM) on a project to address this issue. The project, includes elements that would add a 10-foot barrier separated, bi-directional path for bicycles and pedestrians on the bridge next to westbound traffic, and create a barrier separated bi-directional path from Marine Street to the Stenmark Drive off-ramp to replace the existing bike-on-shoulder configuration in Richmond.

Freeway crossings represent another major gap in the current network. As noted in Table 10, either Class II or Class III bicycle facilities exist on many arterials that cross I-580. However, these facilities tend to end before reaching freeway interchanges, leaving bicyclists unguided and unprotected to negotiate with conflicting vehicular traffic. Providing accommodation to bicyclists within an interchange should be a focus area for future improvements. Improvement ideas include providing on-street bicycle facilities and reconfiguring ramps and interchanges to reduce conflict points. The non-interchange crossings such as the Marina Way South overcrossing and the 2nd Street undercrossing should receive higher priority as there is less conflict between bikes and vehicles. A new bicycle/pedestrian overcrossing near 47th Street should be considered as it would provide a connection between the future UC Richmond Bay Campus and neighborhoods in southeast Richmond near El Cerrito del Norte BART Station. The South Richmond Transportation Connectivity Plan includes conceptual recommendations to improve bicycle and pedestrian connectivity at all I-580 interchanges within Richmond and to provide a new bicycle/pedestrian overcrossing at 47th Street.⁹ Similar treatment can be applied to freeway crossings along I-580 in Marin County, as appropriate.

Gaps along parallel bike facilities should also be addressed, although Caltrans can only play a supportive role in these situations as these gaps are within the jurisdictions of our partner agencies at the local and regional levels. For example, the Richmond Greenway is not connected at its west terminus to the Bay Trail along Richmond Parkway and there is also a major gap at 23rd Street/Carlson Boulevard/Union Pacific (UP) rail tracks in Central Richmond. In Albany, a better connection between the Ohlone Greenway and the Bay Trail should be further explored. Table 21 includes potential bicycle improvement ideas/projects as well as improvements for other modes.

PEDESTRIAN FACILITY

Pedestrian access is not allowed on Bay Area freeways including I-580. People who rely on or choose walking as their means of transportation within the Corridor will have to use the local street network and/or off-street trails to get to their destinations. All three cities along the Corridor enjoy extensive local pedestrian networks of sidewalks and crosswalks. Both the Bay Trail and the Ohlone/Richmond Greenways provide mostly continuous connections for off-street pedestrian travel as well. However, pedestrians are not expected to travel significant distances along the Corridor. Instead, attention should be paid to crossing opportunities on I-580. The bicycle crossings identified in Table 10 in the Bicycle Facility section often double as pedestrian crossings. It should be noted, however, pedestrians cannot legally use a vehicle lane to bridge gaps in the network. Table 11 on the following page lists the crossing opportunities and identifies gaps for pedestrian travel.



⁹ South Richmond Transportation Connectivity Plan: <http://www.ci.richmond.ca.us/2776/SRTCP>

Potential Improvement ideas are found in the South Richmond Transportation Connectivity Plan as mentioned before. Similar treatment can be applied to I-580 crossings in Marin County. However, due to limited resources, priority should be given to areas where land uses and terrain are more conducive to pedestrian travel. Pedestrian improvement projects should be coordinated with bicycle improvement projects to maximize the return on investment.

Table 11. Crossing Opportunities for Pedestrians

Segment	PM	Location	I/C*	Facility Type**	Gaps/Deficiencies
1 ALA R47.171 – CC 6.125	ALA R47.31	Buchanan St UC	Yes	SP, SW, CW	<ul style="list-style-type: none"> No facilities on south side of Buchanan St. No CW crossing Buchanan St at ramp intersections
	CC 0.24	Central Ave OC	Yes	SW, CW	<ul style="list-style-type: none"> No CW crossing Central Ave, especially at WB ramp intersection
	CC 1.21	Bayview Ave OC	Yes	SW, CW	<ul style="list-style-type: none"> No SW on west/north side of Bayview Ave. No CW at ramp intersections
	CC R 2.09	Regatta Blvd OC	Yes	SW	<ul style="list-style-type: none"> No SW on west side of Regatta Blvd. No CW at ramp intersections
	CC R 2.89	S. 23 rd St/Marina Bay Pkwy OC	Yes	SW, CW	<ul style="list-style-type: none"> Large radius ramps allowing high speed vehicle travel and impeding visibility No CW on some legs at ramp intersections
	CC R 3.35	Marina Way OC	No	SW	N/A
	CC R 3.60	Harbour Way OC	Yes	SW, CW	<ul style="list-style-type: none"> Large radius ramps allowing high speed vehicle travel and impeding visibility
	CC R 3.79	Cutting Blvd OC	Yes	SW, CW	<ul style="list-style-type: none"> Large radius WB on-ramp allowing high speed vehicle travel and impeding visibility No CW on some legs at ramp intersections
	CC R 4.09	S. 2 nd St UC	No	SW	N/A
	CC R 4.64	Canal Blvd UC	Yes	SW, CW	<ul style="list-style-type: none"> No CW on some legs at ramp intersections
	CC R 4.85	S. Garrard Blvd UC	No	SW	<ul style="list-style-type: none"> No SW on west side of S. Garrard Blvd
	CC R 5.11	Castro St UC	Yes	SW, CW, Ped path on Median	<ul style="list-style-type: none"> Large radius WB on-ramp allowing high speed vehicle travel and impeding visibility. No CW on some legs Complex intersections requiring better guidance and signage
	CC R 5.43	Marine St UC	Yes	SW, CW	<ul style="list-style-type: none"> No SW on east side of Marine St. No CW on some legs Large radius EB on-ramps from Marine St. and E. Standard Ave. allowing high speed vehicle travel and impeding visibility
	CC 5.80	Western Ave UC	No	Private Road	On Chevron property. Not open to public
	CC 6.13	Toll Plaza UC	No	SP	N/A
3 MRN 2.477 – MRN 4.782	MRN 2.63	Main St/San Quentin UC	Yes	SW, CW	<ul style="list-style-type: none"> No SW on east side of Main St No CW on many legs at ramp intersections
	MRN 3.29	Sir Francis Drake OC	Yes	No ped facility	Bike only
	MRN 4.50	Bellam Blvd UC	Yes	SW, CW	<ul style="list-style-type: none"> No SW on east side of Bellam Blvd No CW on many legs at ramp intersections

* I/C = Interchange

** SP= Shared Path, SW=Sidewalk, CW=Crosswalk

TRANSIT AND RIDE SHARING FACILITY

The I-580 West Corridor enjoys extensive public transportation coverage as shown in Figure 7. Table 12 contains a summary of agencies providing services within the Corridor: Capitol Corridor, San Joaquin Corridor, Amtrak Zephyr, BART, AC Transit, Golden Gate Transit (bus and ferry), and the Water Emergency Transportation Authority (WETA) (ferry). With the exception of Golden Gate Transit, most transit agencies do not provide transit service on I-580 itself. See Appendix C for a summary of these transit agencies. Between the I-80/I-580 North split and the I-580/Regatta Boulevard Interchange, I-580 generally runs parallel to I-80 and SR 123/San Pablo Avenue within a one-mile buffer. See I-80 CSMP and SR 123 TCR for discussion of transit services along those corridors.

Figure 7. Transit Services

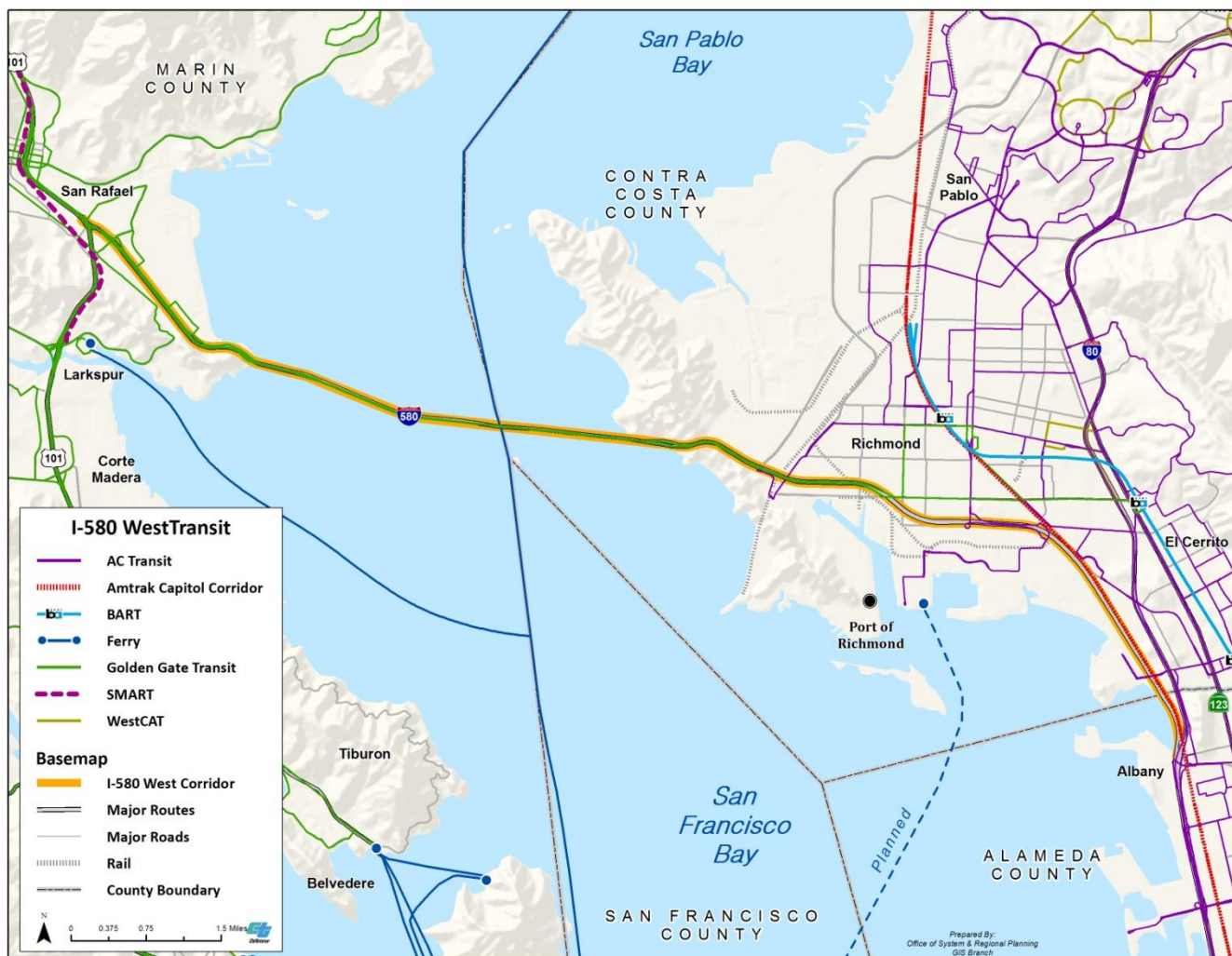


Table 12. Transit Services

Seg	Mode	Transit Operator	Line Name or Number	Route End Points	Operating within State ROW		Operating Period	Peak Headway	Non-Peak Headway	Station Or Street Name	Bikes Allowed onboard
					Y / N	PM					
1	Rail (Intercity)	Amtrak	California Zephyr	Chicago - Emeryville (onto San Francisco via Thruway Bus)	N	-	1 round trip daily	-	-	Richmond	Folding bikes only
		Amtrak/Caltrans	Capitol Corridor	Auburn – San Jose	N	-	4:30 am – 9:55 pm	30-40 min	Up to 2hr 20 min		Yes
			San Joaquin Corridor	Oakland/Sacramento - Bakersfield	N	-	4 Round trips daily				Yes
	Rail (Urban)	BART	Orange*	Fremont - Richmond	N	-	4 am – 12:17 am	15 min	15-25 min	El Cerrito Plaza El Cerrito del Norte Richmond	Yes, except for 1 st car
			Red*	Richmond – Daly City/Millbrae	N	-	4:12 am – 8:01 pm	15 min	15-20 min		
	Bus	AC Transit	71	El Cerrito Plaza BART – Richmond Pkwy Transit Center	N	-	5:00 am – 7:45 pm	30 min	30 min	via Carlson Blvd	Yes
			72M	Oakland Amtrak/Jack London Square - Point Richmond	Y	CC R4.85	4:45 am – 11:24 pm	29-34 min	30-45 min	via San Pablo Ave/Macdonald Ave/S. Garrard Blvd	
			74	Castro Ranch Rd – Harbor Way S & Ford Point	Y	CC R2.09 - R2.89	5:28 am – 9:49 pm	25-32 min	29-32 min	via S 23 rd St/I-580/Regatta Blvd	
			76	El Cerrito del Norte BART – Hilltop Mall	N	-	5:00 am – 8:27 pm	11-31 min	30-32 min	via Cutting Blvd/Harbor Way S	
1-3	Bus	Golden Gate Transit	40/40X**	El Cerrito del Norte BART – San Rafael Transit Center	Y	CC R3.79 [#] - MRN 2.63	5:30 am – 11:25 pm	30 min	1 hr	via Cutting Blvd/I-580	Yes
3	Bus	Golden Gate Transit	23	Shoreline Pkwy at Target – Fairfax/Manor	N	-	Multiple Schedules	1 hr	1 hr	via Francisco Blvd E / 4 th St/ Sir Francis Drake Blvd	Yes
			29	San Rafael Transit Center – Fairfax/Manor	Y	MRN 4.50	Multiple Schedules	30 min	1 hr	via Bellam Blvd/Anderson Dr/ Sir Francis Drake Blvd	
	Ferry	Golden Gate Transit	Larkspur/SF	Larkspur – SF Ferry Bldg	N	-	5:45 am – 9:35 pm	20-35 min	30-85 min	Larkspur	Yes

* Although colors are used to identify BART lines on the system map, BART trains are usually referred to by their destinations

** Route 40X has two trips in between the Route 40 trips during peak periods, resulting in a 15-minute headway between El Cerrito del Norte BART and San Rafael Transit Center

Golden Gate Transit and Ferry and Marin Transit

Based in San Francisco, the Golden Gate Bridge, Highway and Transportation District operates the Golden Gate Bridge and two public transit systems: Golden Gate Transit buses and Golden Gate Ferry. Marin Transit operates local transit routes in Marin County, and contracts out to multiple service providers including Golden Gate Transit. Figure 8 below shows the Golden Gate District (red and blue) and Marin Transit's (green) services near Segment 3 of the I-580 West Corridor.¹⁰

Bus Route 40 connects El Cerrito del Norte BART station to the San Rafael Transit Center. It provides regular service throughout the day and on weekends and operates on I-580 between Cutting Boulevard in Richmond and Main Street in Marin County via the RSR Bridge. Route 40X provides two WB trips during the AM peak and two EB trips during the PM peak. The route is identical to Route 40 except it skips the bus stop in Point Richmond at Tewksbury Avenue and Castro Street. There is also a plan to expand Route 40X by adding three new WB AM trips and three new EB PM trips on weekdays. Routes 40 and 40X provide a critical service to bicyclists crossing the Richmond-San Rafael Bridge, as bikes are not allowed on the bridge at this time.

Golden Gate Ferry operates two lines of services: Larkspur Ferry (Larkspur – San Francisco Ferry Building) and Sausalito Ferry (Sausalito – San Francisco Ferry Building). The Larkspur Ferry Terminal is located at Larkspur Landing off of Sir Francis Drake Boulevard near the Marin County Mart Shopping Center.

Figure 8. Golden Gate District Bus and Ferry Services near RSR Bridge



¹⁰ <http://goldengate.org/>

Figure 9. Golden Gate Bus Routes 40/40X in East Bay



Shuttle Service

In addition to public transportation provided by transit agencies, public and private shuttle services are also available within the I-580 West Corridor.

- UC Berkeley Shuttle – The University operates several shuttle lines. The RFS line connects the Richmond Field Station (RFS) to the El Cerrito Plaza BART Station and to the main campus in Berkeley. The shuttle is open to the general public for a one-way fare of \$1.50.¹¹
- Kaiser Permanente Richmond Medical Center Shuttle – There is a free shuttle service between the Richmond Medical Center and Richmond and El Cerrito del Norte BART Stations, available to employees and visitors to the hospital.

Park and Ride

There are no Park and Ride lots located within the I-580 West Corridor.

Future Transit Improvements

- Richmond Ferry
WETA is developing a new ferry route between the existing San Francisco Ferry Terminal and a new ferry terminal in the City of Richmond. The new ferry service will help divert traffic away from I-580 and I-80 and provide an additional public transportation option for traveling to San Francisco.¹²
- AC Transit Major Corridors Study
AC Transit recently completed a Major Corridors Study to identify infrastructure investments to 11 major corridors to improve customer satisfaction and increase ridership. One of the corridors is the San Pablo/MacDonald Corridor that connects Jack London Square to Richmond/San Pablo, running parallel to I-80 and I-580. The study proposes an upgrade to the existing infrastructure and technology including

¹¹ <http://pt.berkeley.edu/around/beartransit/daytime>

¹² <http://sanfranciscobayferry.com/node/330>

traffic signals adjustment based on real-time data by 2020, and a future upgrade to Bus Rapid Transit service with a dedicated lane on San Pablo Avenue by 2040.¹³

- **West Contra Costa High-Capacity Transit Study**
West Contra Costa Transportation Advisory Committee (WCCTAC) is currently conducting a transit study. The purpose of the study is to identify and evaluate the feasibility and effectiveness of high-capacity transit options in west Contra Costa County. Alternatives being studied include express bus, bus rapid transit, commuter rail and a BART extension. Implementation of a high-capacity transit service in west Contra Costa County would offer additional transportation options and help alleviate congestion on I-80 and Segment 1 of the I-580 West Corridor.

- **Sonoma-Marin Area Rail Transit (SMART)**

In 2008, voters in Marin and Sonoma Counties voted for Measure Q to fund SMART with an additional quarter cent sales tax. The project provides train service and a pedestrian/bicycle shared pathway along existing rail tracks that will provide travel alternatives to US 101. SMART will ultimately provide rail service along seventy miles of the historic Northwestern Pacific Railroad alignment, serving fourteen stations from Cloverdale in Sonoma County to the San Francisco-bound ferry terminal in Larkspur, Marin County.

Construction work has been divided into phases. Phase I involves the first 38-mile service between North Santa Rosa and downtown San Rafael. Major construction work has been completed and the service is planned to begin in Summer/Fall 2017. Plans for Phase II are in the works to extend service north to Cloverdale in Sonoma County and south to Larkspur Landing in Marin County. The Larkspur extension has been funded, while the Cloverdale extension has yet to be funded.¹⁴

Golden Gate Transit's Bettini Transit Center in downtown San Rafael will be relocated to accommodate the SMART extension to Larkspur.

FREIGHT

I-580 West in its entirety is part of the National Network of highways for trucking, defined by the Federal Surface Transportation Assistance Act of 1982. On these highways, federal width and length limits apply. I-580 is also classified as a major truck route in the San Francisco Bay Area Freight Mobility Study (2014).¹⁵ A major truck route is a route/highway segment that has bi-directional average annual daily truck traffic (AADTT) with three or more axles (AADTT with 3+ axles) greater than 3,000 trucks. See Freeway Performance section for truck data. In addition to I-580, many freight facilities are located or near Segment 1 of the Corridor, including seaport, rail lines, and rail yards. See Figure 10 for freight facility location.

¹³ <http://www.actransit.org/coa-2/major-corridors-study/>

¹⁴ <http://main.sonomamarintrain.org/>

¹⁵ http://www.dot.ca.gov/hq/tpp/offices/ogm/regional_level/FR3_SFBAFMS_Final_Report.pdf

Figure 10. Freight Facilities



Port of Richmond

This deep water port is located approximately nine miles northeast of the Golden Gate Bridge in Contra Costa County on the east shore of San Francisco Bay in Richmond. It is California's third largest port in terms of annual tonnage, handling more than 19 million short tons of cargo. Currently, the Port ranks at the top in liquid bulk and automobile tonnage among ports in the San Francisco Bay. The Port is owned by the City of Richmond and is governed by the State Tidelands Trust. There are five city-owned terminals and ten privately-owned terminals for handling bulk liquids, dry bulk materials, vehicle and break-bulk cargoes within the Port. The Port does not handle containers. I-580 passes through the Port area, connecting to I-80 and US 101.

Rail Yards

In 2010, due to a \$40 million Honda Port of Entry Project, a new automobile yard was added to Point Potrero Marine Terminal (PPMT) at the Port of Richmond to enable imported autos to be loaded directly onto rail cars, with the goal of reducing individual auto shuttle trips on local streets in the City of Richmond. The BNSF Railway (BNSF) also owns an automobile yard for carload traffic, located on the north side of I-580 across from the Port of Richmond.



Looking over BNSF Rail Yard from I-580

Rail Lines

Railroads are classified based on their annual operating revenues. The class to which a carrier belongs is determined by comparing its adjusted operating revenues for three consecutive years to the following scale:

- Class I - \$250 million or more
- Class II - \$20 million or more
- Class III - \$0 to \$20 million

The two Class I railroads operating in California are Union Pacific Railroad (UP) and BNSF. Both railroads provide freight rail services within and near the I-580 West corridor.

1. UP

UP is the largest freight railroad in the United States. The Martinez Subdivision is UP's mainline tracks connecting Oakland north to Roseville via Richmond and Martinez. Between the I-580/I-80 North Split (PM ALA R47.17) and Regatta Boulevard (PM CC R2.09), the tracks run adjacent to I-580 before turning north and cutting through central Richmond. According to the 2013 California State Rail Plan, freight train volumes are the highest on the UP Martinez Subdivision, especially between Richmond and Oakland, as this is the segment that carries traffic into/away from the Port of Oakland and it is used by both UP and

BNSF through trackage rights. Amtrak/Capitol Corridor services also operate on this portion of the tracks, further complicating the conflicts between freight and passenger trains.

2. BNSF

BNSF is the second largest railroad in United States in terms of network and is the nation's largest intermodal carrier. In the Bay Area, BNSF carries out its business through its Stockton Subdivision, running from Richmond to Fresno via Martinez and Tracy. The Stockton Subdivision tracks end at the Richmond automobile yard discussed above, but freight service continues south, through trackage rights with UP, to the Oakland International Gateway, BNSF's intermodal yard at the Port of Oakland.

In addition to the two Class I railroads, Richmond Pacific Railroad Corporation (RPRC), a Class III railroad, also provides freight services within the I-580 West corridor. RPRC is a privately-held switching and terminal railroad that operates 2.5 miles of tracks in and around the Port of Richmond. The RPRC shares tracks with both UP and BNSF in Richmond south of I-580. Table 13 lists the freight facilities in the Corridor.

Table 13. Freight Facilities

Facility Type/Freight Generator	Location	Mode	Name	Major Commodity/ Industry	Comments/Issues
Highway	Richmond	Truck	I-580	Various	<ul style="list-style-type: none"> Air quality
Seaport	Richmond	Ship, Rail, Truck	Port of Richmond	Exports: scrap metal, coke, coal, aggregate, zinc, and lead; Imports: petroleum, bauxite, magnetite, vegetable oils, and automobiles	<ul style="list-style-type: none"> Environmental constraints Air quality Limited space for expansion
Rail Yard	Port of Richmond	Ship, Rail	Point Potrero Marine Terminal	Automobiles	
Rail Yard	Richmond	Rail	BNSF automobile yard	Automobile	
Rail Line	Richmond	Rail	BNSF (Class I)	Intermodal, carload	<ul style="list-style-type: none"> Air Quality At-grade crossings with local roads
Rail Line	Richmond, Albany	Rail	UP (Class I)	Intermodal, carload	<ul style="list-style-type: none"> Air quality Train congestion Freight-passenger train conflicts At-grade crossings with local roads
Rail Line	Richmond	Rail	RPRC (Class III)	Switching and terminal railroad	<ul style="list-style-type: none"> Air quality At-grade crossings with local roads



Union Pacific Rail Bridges over I-580
in southeast Richmond

Trade Corridors Improvement Fund

The Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006, approved by the voters as Proposition 1B in 2006, created a \$2 billion program called the Trade Corridors Improvement Fund (TCIF) to fund freight infrastructure improvement projects.¹⁶ There are two TCIF projects located within the I-580 West corridor.

- **Richmond Rail Connector Project** -- An at-grade connector near San Pablo, just north of Richmond, that allows BNSF trains access to UP's Martinez Subdivision rather than traveling through the center of the City of Richmond. Total project cost is \$21.76 million.
- **Marina Bay Parkway Grade Separation Project** – This project resolves major traffic, health, and safety issues in the City of Richmond by constructing a roadway undercrossing in place of an existing at-grade railroad crossing at Marina Bay Parkway between Regatta Boulevard and Meeker Avenue in Richmond. Additionally, the project improves access to the future WETA Richmond ferry and improve air quality through reducing vehicle idling times. Total project cost is \$37.95 million. This project is completed and was opened in December 2015.

¹⁶ <http://www.dot.ca.gov/hq/tpp/offices/ogm/tcif.html>

ENVIRONMENTAL CONSIDERATIONS

The purpose of the environmental scan is to conduct a high-level identification of potential environmental factors that may require future analysis in the project development process. This information may not represent all environmental considerations that can exist within the corridor vicinity. Caltrans supports reducing environmental impacts from the transportation system as an overall strategic objective. One of Caltrans sustainability objectives is to achieve an 80 percent reduction in greenhouse gas emissions below 1990 levels by 2050. The I-580 West Corridor is potentially within the jurisdiction of the San Francisco Bay Conservation and Development Commission (BCDC). Coordination with BCDC is required for project planning and permitting. See Table 14 and Figure 13 for a summary of environmental factors along the I-580 West Corridor.

Table 14. I-580 West Corridor Environmental Considerations

Segment	Section 4(f) Land	Coastal Zone	Farmland/ Timberland ¹⁷	Environmental Justice	Cultural Resources	Visual Aesthetics	Geology/Soils/ Seismic	Floodplain ¹⁸	Climate Change and Sea Level Rise Vulnerability	Hazardous Materials	Naturally Occurring Asbestos ¹⁹	Air Quality ²⁰			Noise	Wetlands	Wild and Scenic Rivers ²¹	Special Status Species	Habitat Connectivity ²²	Fish Passage ²³
												Ozone	2.5	PM 10	CO					
1	High			High	Med			100-500 yr		High						Low-Med				
2	N/A	No	N/A	N/A	Low	Low	Med	N/A	High	N/A	Low	Nonattainment	Nonattainment	Unclassified/Nonattainment	Unclassified/Attainment	N/A	N/A	N/A	N/A	N/A
3	High			High	Low			100-500 yr		Med						Low	High		High	Low

Environmental factors that receive a Medium or High score are discussed in greater details below. Figure 13 also highlights some of the environmental resources along the Corridor.

- Section 4(f) Land**

The Miller/Knox Regional Shoreline represents Section 4(f) resources along the Corridor.

¹⁷ <http://www.conservation.ca.gov/dlrp/fmmp>

¹⁸ FEMA Flood Map Service Center, <http://msc.fema.gov/portal>

¹⁹ Caltrans Areas Likely to Contain Naturally Occurring Asbestos Map:

http://onramp.dot.ca.gov/hq/maint/roadway_rehab/gis/nao.htm

²⁰ National and State Area Designations Maps: <http://www.arb.ca.gov/desig/adm/adm.htm>

²¹ California Wild & Scenic River System: http://www.dot.ca.gov/ser/vol1/sec3/special/ch19wsrivers/CA_System_Rivers.doc

²² California Dept. of Fish and Wildlife Biogeographic Information and Observation System (BIOS) Habitat Connectivity

Viewer: <http://www.dfg.ca.gov/biogeodata/bios/>

²³ Calfish BIOS Map Viewer: <http://www.calfish.org/DataandMaps/MapView.aspx>, California Fish Passage Assessment Database

- **Environmental Justice**

MTC in its most recent RTP, Plan Bay Area (2013), defines “communities of concern” as those neighborhoods with notably high concentrations of four or more of the following: minority persons; low-income individuals; persons who are Limited English Proficient; seniors age 75 and over; persons with disabilities; households without cars; single-parent households; and renters paying more than 50 percent of household income for rent. These communities are considered disadvantaged or vulnerable in terms of both current conditions and potential impacts of future growth.²⁴ Many communities in Albany, southeast and central Richmond as well as in southeast San Rafael fall within this category.

- **Cultural Resources**

The I-580 West Corridor is located in a mostly fully developed area and has minor potential impacts to cultural resources. However, there is a historic bridge, the Stege Drain Bridge, located at PM CC 1.17 in Richmond. There is currently a project in development to retrofit the bridge. See Table 20.

- **Geology/Soils/Seismic**

Although not located directly on a fault zone, the I-580 West Corridor, especially Segment 1, is within close proximity to the Hayward Fault. See Figure 11.²⁵

- **Climate Change and Sea Level Rise Vulnerability**

Many areas along I-580 West are susceptible to inundation due to sea level rise as a result of the climate change. It is assumed the sea would rise 16 inches by 2050 and 55 inches by 2100. For Segment 1, Golden Gate Fields, Point Isabel, Richmond South Shoreline areas, the Port of Richmond, certain areas in Point Richmond, Point Molate and Point San Pablo are all susceptible to inundation. Segment 3 is entirely located in an area potentially subject to sea level rise inundation. Figure 14 illustrates these areas. Although the RSR Bridge in Segment 2 is not subject to inundation threat, the rising sea coupled with extreme weather events such as major storms could have maintenance implications.

Figure 11. Hayward Fault



- **Hazardous Materials**

I-580 West is located in a fully developed urban area, so there are many underground tanks located within the corridor. See Figure 12 for locations.

- **Air Quality**

The I-580 West corridor is located entirely within the San Francisco Bay Area Air Basin, which is regulated by the BAAQMD. The basin is classified as nonattainment for ozone and Particulate Matters (PM) 2.5

²⁴ Final Plan Bay Area, <http://planbayarea.org/plan-bay-area/final-plan-bay-area.html>, page 112-113

²⁵ http://seismo.berkeley.edu/hayward/hayward_fault.html

under both the national and State designations. For PM 10, the area is classified as unclassified for national designation but nonattainment for State designation.

- **Noise**

There are several residential neighborhoods in Richmond located adjacent to the freeway. The Nystrom Elementary School located at 230 Harbour Way South and the John F. Kennedy High School located at 4300 Cutting Boulevard are both within ¼ mile away from I-580.

- **Wetlands**

Wetlands are found along the Richmond South Shoreline and in Point Isabel, Point Richmond, Point Molate and Point San Pablo within Segment 1 as well as along the San Pablo Bay in San Rafael within Segment 3.

- **Special Status Species**

There are several species of concern found along or near I-580, including California Seablite, Marin Western Flax, White-rayed Pentachaeta, California Black Rail, California Clapper Rail, and Salt-Marsh Harvest Mouse.

- **Fish Passage**

According to the California Fish Passage Database²⁶, there is a partial fish passage barrier at the Cerrito Creek, which is part of the boundary between Alameda County and Contra Costa County. See Figure 12 for the location of the barrier.

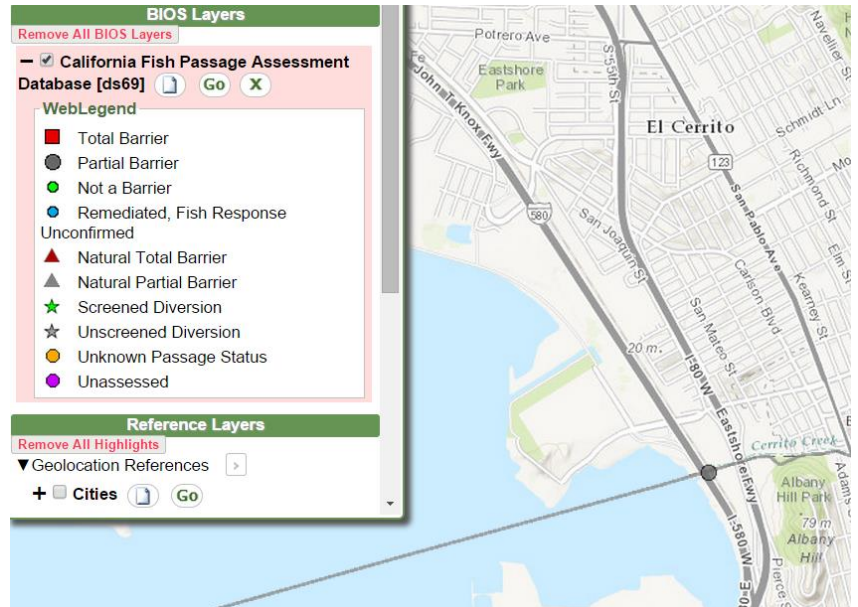


Figure 12. Fish Passage Barrier in BIOS

²⁶ Calfish BIOS Map Viewer: <http://www.calfish.org/DataandMaps/MapView.aspx> , California Fish Passage Assessment Database

Figure 13. Environmental Factors

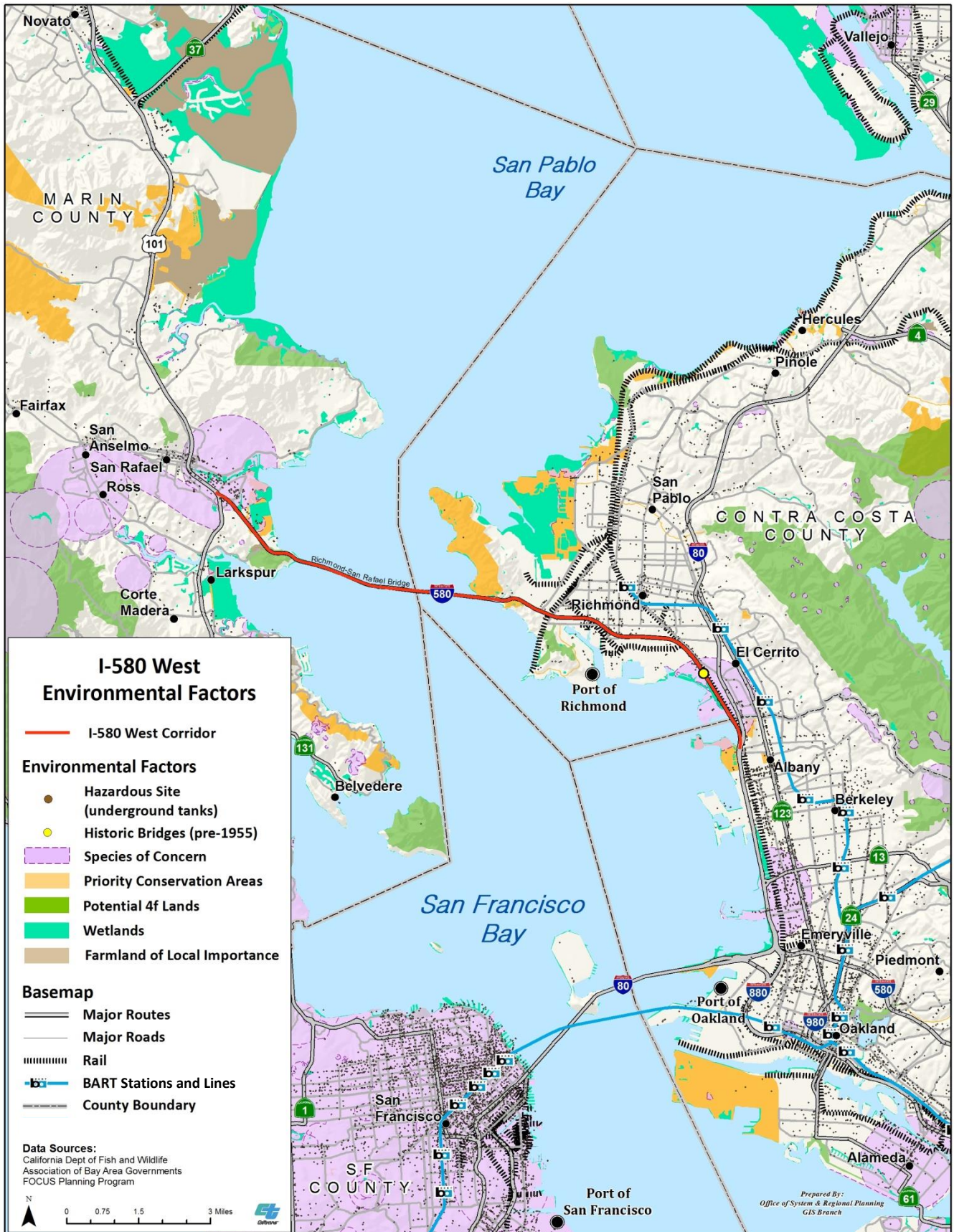
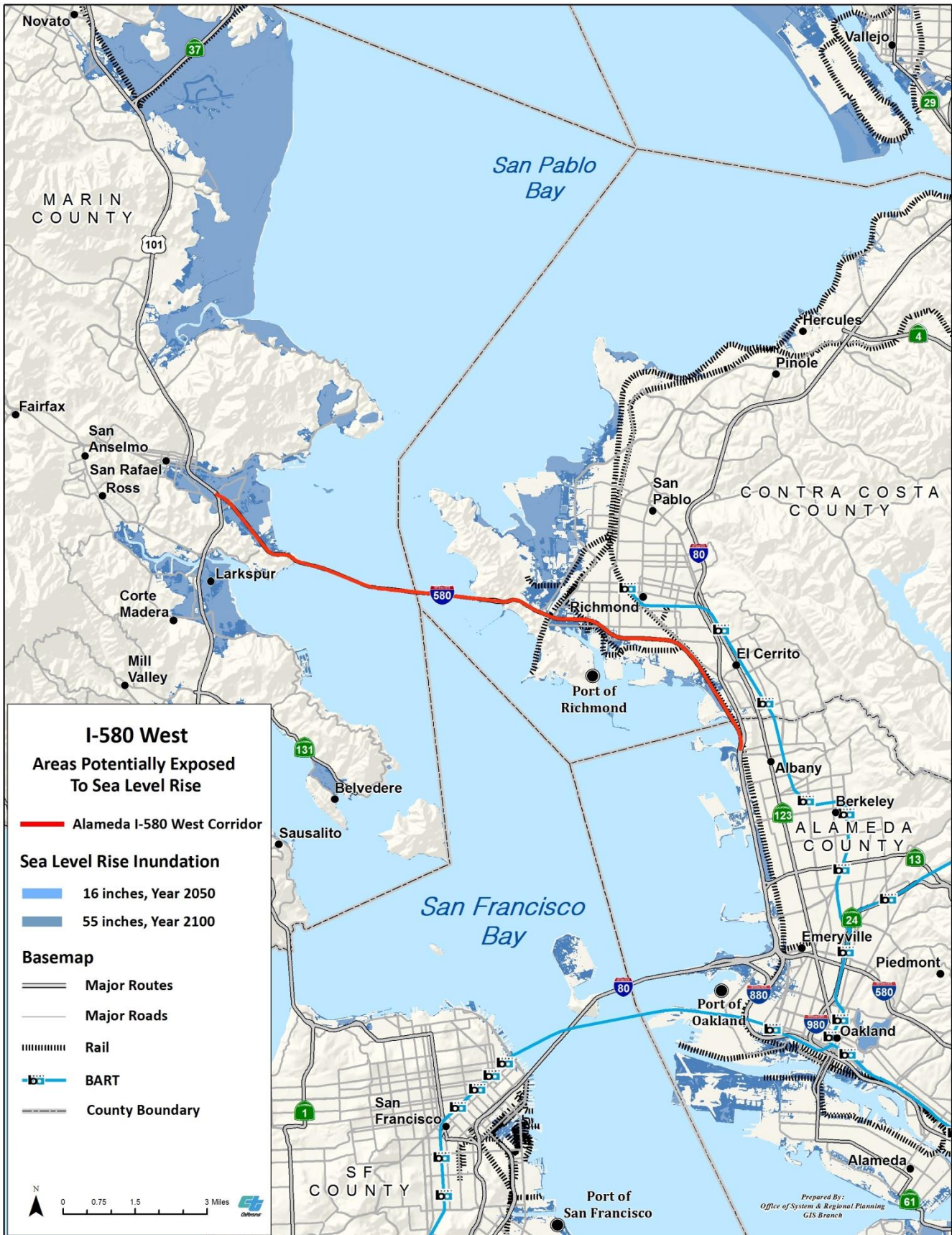


Figure 14. Areas Potentially Susceptible to Sea Level Rise



FREEWAY PERFORMANCE

This section presents existing and projected future conditions of the freeway portion of the Corridor. Caltrans Traffic Census data are presented but the majority of this section is based on the analysis from the Traffic Operations Analysis Report (TOAR) for the Richmond-San Rafael Bridge Access Improvement Project approved in March 2016. The analysis from the TOAR is based on CCTA's travel demand forecasting model, and includes a 2014 base year, a 2020 opening year and a 2040 design year to capture the effect of the RSR Bridge Access Improvement Project. The TOAR study area includes northbound US 101 from north of the Tamalpais Drive Interchange to I-580, southbound US 101 from 2nd Street in San Rafael to I-580 Interchange, I-580 between US 101 and Central Avenue in Richmond in both directions, and Sir Francis Drake Boulevard between west of US 101 and I-580.

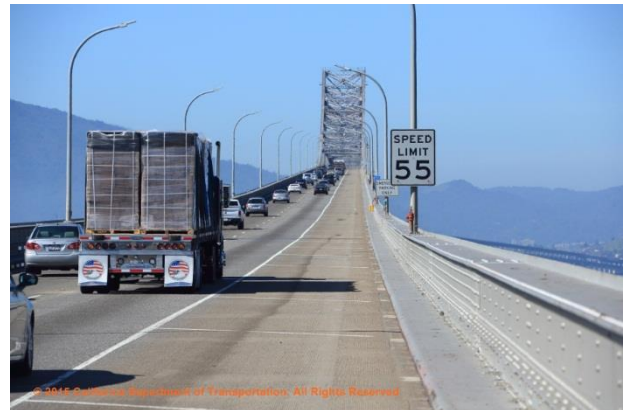
RICHMOND-SAN RAFAEL BRIDGE ACCESS IMPROVEMENT PROJECT

Caltrans is working with BATA, CCTA and TAM to develop a project to improve the RSR Bridge including both east and west approaches to the Bridge. The project includes three elements:

- Element 1: Add an eastbound travel lane between Sir Francis Drake Blvd on-ramp in Marin County and just east of the Marine Street/East Standard Avenue off-ramp in Contra Costa County, including converting the existing right shoulder on the lower deck of the bridge to a third lane. The bridge portion will be a peak period use lane (PPUL), to be evaluated after a four-year pilot period, while the rest of the new lane will be permanent and full time.
- Element 2: Create a barrier separated bi-directional path from Marine Street to the Stenmark Drive off-ramp west of the Toll Plaza.
- Element 3: Add a ten-foot bi-directional path for bicycle and pedestrian traffic by converting the existing WB right shoulder on the upper deck, separated from motor traffic by a movable concrete barrier. The path will begin at Stenmark Drive west of the Toll Plaza maintenance buildings on an easement through Chevron property and end at the Main Street off-ramp. Element 3 will also be reevaluated after the four-year pilot period.



Existing Lower Deck of the RSR Bridge



Existing Upper Deck

CALTRANS TRAFFIC CENSUS DATA

Caltrans Traffic Census data²⁷ are reported in Table 15 to supplement the TOAR. The Average Annual Daily Trip (AADT) ranged between 68,000 and 93,000, while the Average Annual Daily Truck Traffic (AADTT) accounted for more than six percent of the AADT within the Corridor in 2014.

²⁷ <http://www.dot.ca.gov/trafficops/census/>

Table 15. 2014 Traffic Census Data*

Segment #	1	2	3
PM Limits	ALA R47.17 - CC 6.13	CC 6.13 – MRN 2.48	MRN 2.48 – MRN 4.78
AADT	93,000	76,000	68,000
AADTT	5,710	N/A	4,692
Total Trucks (% of AADT)	6.14 %	N/A	6.9 %
5+ Axle AADTT	2,861	N/A	1,750
5+ Axle Trucks (as % of AADTT)	50 %	N/A	37 %

* Traffic counts reported at PM CC R47.35 for Segment 1, CC 6.13 for Segment 2 and MRN 4.78 for Segment 3

TOAR DATA

In March, 2016, Caltrans approved a TOAR as part of the RSR Bridge Access Improvement Project development process. Focusing on operation conditions during peak periods, the TOAR concludes that although traffic demand increases over time and Element 1 would induce additional motor traffic demand as a result of adding freeway capacity, the RSR Bridge Access Improvement Project would be able to accommodate the increased demand and significantly improve average travel speed and reduce travel time and delay in the EB direction in 2020 and 2040, when compared to the No-Project Scenario. Element 1 would result in an increase in vehicle miles traveled (VMT), which is the product of the total volume on a road or highway segment and the length of that segment. See Table 16 for peak hour results from the TOAR.

Table 16. Peak Hour Data

Segment #	1	2	3
PM Limits	ALA R47.17 - CC 6.13	CC 6.13 – MRN 2.48	MRN 2.48 – MRN 4.78
WB			
2014 AM Peak Volume	3,132 – 3,717	3,717	N/A
2020 AM Peak Demand	3,270 – 4,390	4,390	
2040 AM Peak Demand	3,430 – 4,980	4,980	
EB			
2014 PM Peak			
Volume	3,120 - 3382	3,600	1,876
LOS	B - D	E	F
2020 PM Peak			
Demand without Project	3,610 - 3,870	4,410	1,970
Level of Service (LOS)	B - D	E	F
Demand With Project	3,620 - 3,880	4,440	1,980
LOS	B - E	D	C
2040 PM Peak			
Demand without Project	4,270 – 4,490	5,140	2,460
LOS	B - F	F	F
Demand with Project	4,340 – 4,470	5,290	2,520
LOS	B – F	D	C - E

Note:

- WB data reported at 23rd Street/Marina Bay Parkway and the Toll Plaza. Segment 3 was not included.
- EB data reported at Bellam Boulevard, the Toll Plaza, 23rd Street/Marina Bay Parkway and east of Central Avenue.
- 2014 volumes did not reflect demand, as all demand was not served due to existing congestion.
- “Project” refers to the RSR Bridge Access Improvement Project.
- Peak hour varies depending on location. Highest number reported for each location. LOS grades are summaries of multiple sections within a segment and do not correspond to the demand data locations.

Bottlenecks

The TOAR has identified bottlenecks along the I-580 West Corridor, as listed in Table 17. A bottleneck is a location where traffic demand exceeds the capacity of the roadway. A bottleneck is typically caused by a surge in demand by merging traffic at an on-ramp, or by a reduction in capacity, such as a lane drop, driver distractions, or incident.

The WB bottlenecks identified in 2014 would continue to exist in 2020 and 2040 because no capacity increasing projects have been proposed in the WB direction as part of the RSR Access Improvement Project. The bicycle/pedestrian path on the upper deck will be reevaluated after the four-year pilot period. The solutions to the WB bottlenecks will rely on multimodal improvements to promote mode shift as well as operational strategies to better manage the congestion in the Corridor.

In the EB direction, element 1 of the RSR Bridge Access Improvement Project would add capacity to the RSR Bridge and eliminate a major bottleneck in the Corridor. In addition, there is and will continue to be a bottleneck on WB I-80 downstream of EB I-580 and a new EB bottleneck will develop at the EB I-580 Central Avenue on-ramp in 2040, resulting in congestion in the EB direction on I-580.

Table 17. I-580 West Corridor Bottlenecks

Bottleneck		2014	2020		2040	
WB	Toll Plaza	Y	Y		Y	
	East End of RSR Bridge	Y	Y		Y	
EB			No Project	With Project	No Project	With Project
	RSR Bridge east of the Main Street On-ramp	Y	Y	N	Y	N
	Central Avenue On-ramp	N	N	N	Y	Y
	Sir Francis Drake Boulevard On-ramp*	Y	Y	N	Y	N

*The Sir Francis Drake on-ramp bottleneck affects traffic on Sir Francis Drake Boulevard only, but the RSR Bridge Access Improvement Project would eliminate this bottleneck.

Measures of Effectiveness

The TOAR also reports several measures of effectiveness to gauge performance of I-580 during PM peak periods in the EB direction with or without the RSR Bridge Access Improvement Project. As shown in Table 18, the Access Improvement Project would reduce travel time, reduce delay and improve travel speed, but contribute to additional VMT, resulting in an increase of 6.8 percent in 2020 and 24.5 percent in 2040, compared to the No-Project Scenario.

At the end of the four-year pilot period, Elements 1 and 3 described on page 37 including the EB PPUL will be reevaluated to determine the future use of the shoulder space on the RSR Bridge.

Table 18. Measure of Effectiveness for EB I-580 PM Period

Measure*	2014	2020		2040	
		No Project	With Project	No Project	With Project
Average Travel Time (minutes)	19.5	23.5	12.2	53.0	14.6
Average Travel Speed (mph)	38.4	32	62	14.1	51.2
Maximum Individual Vehicle Delay (minutes)	18.2	22.2	1.2	73.8	9.7
Vehicle Miles Traveled (VMT)	57,623	54,655	58,372	54,381	67,688
Vehicle Hours of Delay (VHD) in hours	578	898	78	1,642	128

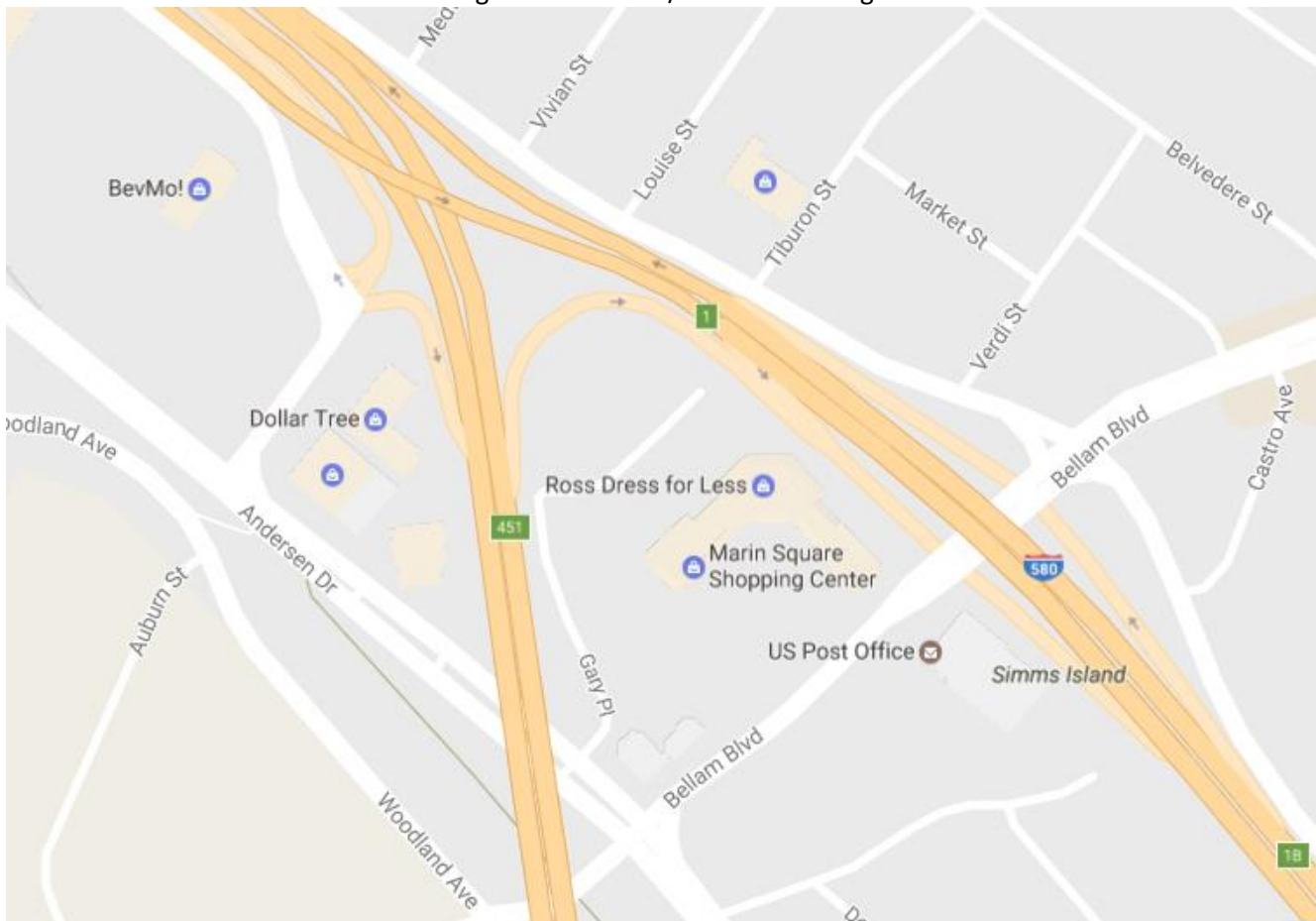
* Measures reflect vehicles traveling between 2nd Street on-ramp in San Rafael and the Central Avenue on-ramp in Richmond

OTHER CORRIDOR ISSUES

US 101/I-580 CONNECTOR

The existing US 101/I-580 Interchange is missing two movements: from NB US 101 to EB I-580 and from WB I-580 to SB US 101. See Figure 15 below. Drivers wishing to make these connections have to either use the ramps at the Bellam Boulevard Interchange and local streets or take Sir Francis Drake Boulevard as an alternative route. As a result, Sir Francis Drake Boulevard is currently experiencing significant congestion during commute hours. The RSR Access Improvement Project would reduce but not eliminate such congestion. Caltrans is working with TAM to improve access to the third lane at Bellam Boulevard and on Sir Francis Drake Boulevard. MTC's Final Preferred Scenario and Investment Strategy for Plan Bay Area 2040 also includes a project to study and design direct connectors to address these missing movements, as shown in Table 20 on page 45. This TCR recommends ramp meters be implemented at these future freeway-to-freeway connector ramps, to be consistent with the general District policy on ramp metering set forth in District 4 Directive 97-03 (effective November 1997).

Figure 15. US 101/I-580 Interchange



POTENTIAL SOLUTIONS FOR WB CONGESTION

As indicated in Table 17, there are two WB bottlenecks at the Toll Plaza and the east end of the RSR Bridge. Depending on the result of the pilot study, the shared path on the upper deck could be retained, removed or converted to other uses. Another potential solution is to study the feasibility to restore the WB HOV lane that used to exist on I-580 and extend it to the Toll Plaza. By reintroducing the HOV lane, there could be travel time saving for buses and carpool users. Another solution is to coordinate with transit agencies in the Corridor to improve transit service. For example, transit service on I-580 could be improved by either enhancing existing Golden Gate Transit Routes 40 and 40X or providing a new AC Transit route connecting BART Stations in Contra

Costa County to major transit hubs in Marin County such as the San Rafael Transit Center, the Larkspur Landing Ferry Terminal, or the future SMART Train Station in Larkspur. A new ferry service between the future Richmond Ferry Terminal and the Larkspur Landing Ferry Terminal would be another alternative. A new Park-and-Ride lot in Richmond would support the potential WB HOV lane as well as the improved transit service. Other strategies include promoting causal carpooling and ride-sharing services as well as encouraging shuttle services by employers, although Caltrans can only play a supportive role in these projects. It should be noted that MTC is studying the feasibility of a Park-and-Ride lot near Buchanan Street in Albany. This particular location is within close proximity of the I-580 West but is mainly intended to serve transit trips to San Francisco.

RAMP METERING

As mentioned in the Bottlenecks section, there is a bottleneck on WB I-80 just east of the Corridor. Implementing ramp metering at the EB I-580 to WB I-80 connector would help manage this bottleneck. This TCR also recommends the implementation of ramp metering at all freeway on-ramps within the Corridor to help manage existing and future mainline bottlenecks, reduce congestion and improve overall freeway operation. The 2015 Ramp Metering Development Plan supports ramp metering implementation at all freeway on-ramps along the I-580 West Corridor, including the EB I-580 to WB I-80 connector.²⁸ Impacts from implementing these ramp meters will be further evaluated during project development.

TRANSPORTATION SYSTEM MANAGEMENT AND OPERATIONS (TSMO)

Caltrans is committed to effective TSMO to optimize the performance of California's transportation systems for all users and modes of travel. TSMO strategies are essential to a performance-based decision making process Caltrans will use to improve the efficient and effective operation of the transportation network. Examples of TSMO strategies include, but are not limited to, ramp metering, traffic signal synchronization, ITS and managed lanes. Efficiency can often be achieved by operational improvements through ITS deployments. These include four types of management for improving throughput:

- System management for recurring localized congestion (for instance, ramp metering, managed lanes, traveler information, dynamic speed limit, traffic signals and transit priority, Integrated Corridor Management [ICM], parking management system, automated vehicles).
- Incident management for non-recurrent congestion (for instance, detection-verification-response, CCTV, CMS, HAR, weather detection, traveler information system, ICM).
- Event management for emergencies, disasters and other occurrences (for instance, through system monitoring, evacuation management, route selection, ICM).
- Asset Management for managing existing infrastructure and other assets to deliver an agreed standard of service. One of the first steps in the efficient management of the transportation system will be the completion and implementation of a Transportation Asset Management Plan.

In partnership with regional and local agencies, and other stakeholders, operational strategies form the basis of ICM. TSMO and ICM require proactive integration of the transportation systems to efficiently move people and goods along highly congested urban corridors. TSMO and ICM strategies improve operations of multimodal transportation infrastructure.

Caltrans Strategic Management Plan 2015–2020 has a Strategic Objective to “(E)ffectively manage transportation assets by implementing the asset management plan, embracing a fix-it-first philosophy” and specifies a target of “(B)y 2020, maintain 90% or better ITS elements health.” Operations and maintenance (O&M) resources are essential to achieve this fix-it-first target. Many TSMO strategies involve ITS equipment. As more TSMO/ITS elements (ramp meters, CCTV, CMS, detection stations, etc.) are implemented, O&M resource need will continue to grow.

²⁸ <http://www.dot.ca.gov/trafficops/tm/docs/RampMeteringDevelopmentPlan.pdf>

CORRIDOR CONCEPT

CONCEPT RATIONALE

The concept reflect a TSMO approach that combines managed lanes, ramp metering, ITS, and multimodal improvement strategies.

Segment 1

Segment 1 of the I-580 West Corridor will remain a five to six-lane freeway. In the eastbound (EB) direction, a bottleneck downstream on WB I-80 currently causes traffic to backup onto I-580 during the AM peak, while an additional bottleneck at the Central Avenue on-ramp is expected to develop during the PM peak in 2040. Capacity increasing projects on EB I-580 will not solve the bottleneck on I-80 and fixing the future bottleneck at Central Avenue may exacerbate the I-80 bottleneck. Instead, attention should be given to the implementation of ramp metering at freeway on-ramps as well as freeway-to-freeway connector to better manage the flow of traffic within the Corridor. The existing I-80/I-580 Interchange is also missing two movements: from WB I-80 to WB I-580 and from EB I-580 to EB I-80. However, because the two freeways run roughly parallel to each other in close proximity at this location, local streets such as Buchanan Street and Central Avenue in the vicinity or Richmond Parkway farther out already provide sufficient capacity for traffic making such connections. Therefore, this TCR does not propose new direct connectors at this location. An EB lane will be added to the section between the east end of the RSR Bridge and Marine St/East Standard Avenue. This additional lane is part of the RSR Bridge Access Improvement Project. In the WB direction, no change is proposed for the 25-year Capital Concept, although this TCR recommends a study to examine the feasibility of restoring the previous WB HOV lane between Central Avenue and Marin Street and extending it to the Toll Plaza, in addition to improvements listed in the Multimodal Concept section below. Another operational improvement is to convert all lanes at the Toll Plaza to Electronic Toll Collection (ETC), as suggested by MTC/BATA and CCTA.

Segment 2

There is currently a project to add an EB Peak Period Use Lane (PPUL) on the lower deck as well as a WB bicycle/pedestrian path on the upper deck. Both elements are being implemented as a four-year pilot project as part of the RSR Bridge Access Improvement Project. After the four-year pilot period, they will be evaluated for future roadway configuration. While not superseding the conclusions of the evaluation, this TCR proposes to retain the PPUL as a strategy to solve EB congestion during the PM peak and recommends deferring a decision on the WB bicycle/pedestrian path until the evaluation is done. If it is decided not to keep the shared path, the available shoulder space could be converted to a PPUL as well.

Segment 3

Future concept between Sir Francis Drake Boulevard and the west end of the RSR Bridge in Segment 3 will have an additional EB lane as part of the RSR Bridge Access Improvement Project. The rest of the Segment will remain a freeway with four mixed-flow lanes. New direct connectors will be added to the US 101/I-580 Interchange to address the currently missing movements. Ramp metering is recommended to be deployed at freeway on-ramps and future freeway-to-freeway connectors as well.

Multimodal Concept

A more effective approach to manage freeway congestion is to promote more efficient land use and to encourage alternative modes of transportation. While land use is largely controlled by local jurisdictions, it is within Caltrans purview to accommodate non-auto modes of transportation within the State right-of-way and support off-system multimodal improvements that can benefit State facilities and further Caltrans Mission and Goals. Therefore, this TCR proposes a multimodal concept that includes these elements:

- Exploring the possibility of further enhancing Golden Gate Transit Routes 40 and 40X and expanding the Alameda-Contra Costa Transit District (AC Transit) bus service operating within the I-580 right-of-way

- Adding a new Park-and-Ride lot in Richmond to support the possible WB HOV lane (Central Avenue to Toll Plaza) and enhanced bus service suggested above
- Transit bypass lanes and/or transit signal priority where feasible during ramp meter development
- Supporting development of ferry service between Richmond and Larkspur
- Providing better freeway crossing facilities including overcrossings (OCs) and undercrossings (UCs) for bicycles and pedestrians at both interchange and non-interchange locations (See Tables 10 and 11)
- Supporting gap closure projects on parallel regional and local trail systems including Bay Trail and Ohlone Greenway/Richmond Greenway
- Supporting casual carpooling, ridesharing, employer shuttles and emerging transportation services/technologies

Table 19. Corridor Concept

Segment	Post Miles (PM)	Segment Description	Existing Facility	25-Year Capital Facility Concept	25-Year System Operations and Management Concept
1	ALA_580 R47.17 – CC_580 6.13	I-80/I-580 North Split to Toll Plaza	5-6F	5-6F*	<ul style="list-style-type: none"> • Additional mainline detection • Ramp metering deployment • All electronic toll collection • Multimodal improvements
2	CC_580 6.13 – MRN_580 2.48	Toll Plaza to West End of the Richmond San Rafael Bridge	4F	4F + 1 PPUL	<ul style="list-style-type: none"> • Additional mainline detection • Multimodal improvements
3	MRN_580 2.48 – MRN_580 4.78	West End of Richmond San Rafael Bridge to US 101	4F	4-5F	<ul style="list-style-type: none"> • Additional mainline detection • Ramp metering deployment • Multimodal improvements

F = Freeway PPUL = peak period use lane

PLANNED AND PROGRAMMED PROJECTS AND STRATEGIES

Table 20. Planned and Programmed Projects

Seg.	Description	Planned or Programmed	Location	Source	Project ID/EA
1, 3	Ramp Metering at I-80/I-580 connector and all on-ramps along the Corridor	Planned	ALA 47.17/ CC 7.79	2015 RMDP	N/A
1	Stege Drain Super Structure Rehab	Programmed	CC 1.17/1.17	2016 SHOPP	2J720
1	Scofield Undercrossing Seismic Retrofit	Programmed	CC 5.8/5.8	2016 SHOPP	4G890
1	Replace Maintenance Building	Programmed	CC 6/6.3	BATA	00394
1*	Bike Path on I-580 from Castro St to Toll Plaza	Programmed	CC 5.1/6.1	Local	0G570
1-3*	RSR Bridge Access Improvement	Programmed	CC 5.1/ MRN 4.8	BATA	2J680
1-3*	Shared Bike/Pedestrian Path on the Upper Deck of the RSR Bridge	Programmed	CC 4.8/MRN 4.8	BATA	4J710
1-2	Upgrade Electrical Substations at RSR Bridge	Programmed	CC 4.8/7.8	BATA	3G364
2	Replace Joint Seal and Related Work on RSR Bridge	Programmed	CC 6.1/7.8	BATA	3G457
2	Replace Travelers and Rails on RSR Bridge	Programmed	CC 6.1/7.8	BATA	3G474
2	Replace Air & Water Supply Lines and Install New Water Systems on Toll Bridge	Planned	CC 6.2/7.8	BATA	3G478
2	Upgrade Substations and Cable on RSR Bridge	Planned	CC 6.2/7.8	BATA	3G368
2	RSR Bridge Structural Improvements	Programmed	CC 6.2/7.8	BATA	3G460
2	RSR Bridge Structural Painting	Programmed	CC 6.3/7.7	BATA	3G484
3	Upgrade Bridge Rail at Sir Francis Drake Blvd Overcrossing and Bellam Undercrossing	Programmed	MRN 3.3/3.3	2014 SHOPP	4G470
3	Re-grade Slope and Repair Down Drain near EB Off-ramp to San Quentin	Programmed	MRN 2.7/2.7	2014 SHOPP	1SS59
3	US 101/580 Interchange Direct Connector - PAED	Planned	MRN 4.8	PBA2040	17-03-0007

* All part of the Richmond-San Rafael Bridge Access Improvement Project, currently under construction

PROJECTS AND STRATEGIES TO ACHIEVE CONCEPT

Table 21. Proposed Projects and Strategies

Seg	Description	Location	Category
1	Upgrade Interchanges to Better Facilitate Bike/Pedestrian Crossing Freeway	All I-580 freeway interchanges in Richmond, especially at: <ul style="list-style-type: none"> • S 23rd Street/Marina Bay Parkway (CC R2.89) • Harbor Way South (CC R3.60) • Cutting Boulevard (CC R3.79) 	Bike/Ped
1	Implement Bike Facilities (Class II or Class III) at Non-interchange Crossing Locations	<ul style="list-style-type: none"> • Marina Way South OC (CC R3.35) • 2nd Street UC (CC R4.09) 	Bike
1	New Bike/Ped OC near S 47th Street	<ul style="list-style-type: none"> • S 47th Street (approx. CC R1.75) 	Bike/Ped
1	Support Gap Closure along Ohlone Greenway, the Richmond Greenway, and Bay Trail	Off system	Bike/Ped
1	Remove Partial Fish Passage Barrier	Cerrito Creek (ALA 48.04)	Mitigation
1	Study the Feasibility of a New Park-and-Ride Lot in Richmond	TBD	Park-and-Ride
1	Convert the Toll Plaza to All-Electronic Toll Collection	Toll Plaza (CC 6.13)	Fwy/ITS
1/2/3	Implement Additional Mainline Detection	I-580 West mainline where detection gaps exist	Fwy/ITS
1/2/3	Capital Preventive Maintenance	Mainline Sections that received a Bad/Poor Ride Only grade (see Figure 5)	Fwy/Preservation
1/2/3	Support Enhanced/Expanded Transit Services between Contra Costa County and Marin County	Potentially between BART stations in Contra Costa County to San Rafael Transit Center, Larkspur Ferry Terminal or other Marin County locations via RSR Bridge	Transit – Bus/Express Bus/BRT
1/2/3	Support New Ferry Service between Richmond Terminal and Larkspur Landing Terminal	Off-System	Transit - Ferry
1/2/3	Support Casual Carpooling, Ride Sharing and Other Emerging Technologies	Off-System	Fwy/New Tech
1/3	Implement Ramp Meters, including Transit Bypass Lane and/or Transit Signal Priority where feasible	All on-ramps, the EB I-580 to WB I-80 connector and future NB US 101 to EB I-580 and WB I-580 to SB US 101 connectors	Fwy/ITS
3	Upgrade Interchanges to Better Facilitate Bike/Pedestrian Crossing Freeway	I-580 freeway interchanges in Marin County: <ul style="list-style-type: none"> • Main Street/San Quentin (MRN 2.63) • Bellam Boulevard (MRN 4.50) 	Bike/Ped

APPENDIX

APPENDIX A GLOSSARY OF TERMS AND ACRONYMS

Acronyms

AADT – Annual Average Daily Traffic
AADTT – Annual Average Daily Truck Traffic
AB – Assembly Bill
ABAG – Association of Bay Area Governments
ADA – Americans with Disabilities Act of 1990
ADT – Average Daily Traffic
Alameda CTC – Alameda County Transportation Commission
ATP – Active Transportation Program
BAAQMD – Bay Area Air Quality Management District
BCDC – Bay Conservation and Development Commission
BRT – Bus Rapid Transit
BY – Base Year
Caltrans – California Department of Transportation
CARB – California Air Resources Board
C/CAG – City/County Association of Governments of San Mateo County
CCC – California Conservation Corps
CCTA – Contra Costa Transportation Authority
CDFW – California Department of Fish and Wildlife
CEC – California Energy Commission
CESA – California Endangered Species Act
CFAC – California Freight Advisory Committee
CFMP – California Freight Mobility Plan
CMA – Congestion Management Agencies
CMAQ – Congestion Mitigation and Air Quality
CMP – Congestion Management Plan
CSFAP – California Sustainable Freight Action Plan
CSMP – Corridor System Management Plan
CEQA – California Environmental Quality Act
CSS – Context Sensitive Solutions
CTC – California Transportation Commission
CTP – California Transportation Plan
DD – Deputy Directive
DSMP – District System Management Plan
ECA – Essential Connectivity Areas
EPA – Environmental Protection Agency
FAST Act – Fixing America’s Surface Transportation Act
FASTLANE – Fostering Advancements in Shipping and Transportation for the Long-Term Achievement of National Efficiencies grant program
FHWA – Federal Highway Administration
FSR – Feasibility Study Report
FSTIP – Federal Statewide Transportation Improvement Program
FTA – Federal Transit Administration
FTIP – Federal Transportation Improvement Program
GHG – Greenhouse Gas

GIS – Geographic Information System
 HCP – Habitat Conservation Plan
 HOT – High Occupancy Toll lane
 HOV – High Occupancy Vehicle lane
 HY – Horizon Year
 ICM – Integrated Corridor Mobility
 IGR – Intergovernmental Review
 ITIP – Interregional Transportation Improvement Program
 ITS – Intelligent Transportation System
 ITSP – Interregional Transportation Strategic Plan
 KPRA – Kingpin-to-Rear-Axle
 LOS – Level of Service
 MAP-21 – Moving Ahead for Progress in the 21st Century
 MPO – Metropolitan Planning Organizations
 MTC – Metropolitan Transportation Commission
 NOA – Naturally Occurring Asbestos
 NCCP – Natural Community Conservation Plan
 NEPA – National Environmental Policy Act
 NHS – National Highway System
 NHFN – National Highway Freight Network
 NMFN – National Multimodal Freight Network
 NVRTA – Napa Valley Transportation Authority
 PAED – Project Approval/Environmental Document
 PBA – Plan Bay Area
 PCA – Priority Conservation Area
 PDA – Priority Development Area
 PFN – Primary Freight Network
 PID – Project Initiation Document
 PIR – Project Initiation Report
 PM – Post Mile
 PM 2.5 – Particulate Matter 2.5 micrometers or less in diameter
 PM 10 – Particulate Matter 10 micrometers or less in diameter
 PSR – Project Study Report
 PR – Project Review
 PTSF – Percent Time Spent Following
 RHNA – Regional Housing Needs Allocation
 RTP – Regional Transportation Plan
 RTIP – Regional Transportation Improvement Program
 RTPA – Regional Transportation Planning Agencies
 SACOG – Sacramento Area Council of Governments
 SAFETEA-LU – Safe, Accountable, Flexible and Efficient Transportation Equity Act, a Legacy for Users
 SB – Senate Bill
 SCS – Sustainable Community Strategies
 SCTA – Sonoma County Transportation Authority
 SFCTA – San Francisco County Transportation Authority
 SHOPP – State Highway Operation Protection Program
 SHS – State Highway System
 SJCOG – San Joaquin Council of Governments
 SMF – Smart Mobility Framework
 SR – State Route

STA – Solano Transportation Authority
STIP – State Transportation Improvement Program
STP – Surface Transportation Program
STRAHNET – Strategic Highway Network
TAM – Transportation Authority of Marin
TCIF – Trade Corridors Improvement Fund
TCRP – Transit Cooperative Research Program
TEA-21 – Transportation Equity Act for the 21st Century
TCR – Transportation Concept Report
TIGER – Transportation Investment Generating Economic Recovery
TDM – Transportation Demand Management
TMP – Transportation Management Plan
TMS – Transportation Management System
TSN – Transportation System Network
USFWS – United States Fish and Wildlife Service
VMT – Vehicle Miles Traveled
VTA – Santa Clara Valley Transportation Authority
VPH – Vehicles per Hour

Definitions

AADT – Annual Average Daily Traffic is the total volume for the year divided by 365 days. The traffic count year is from October 1st through September 30th. Traffic counting is generally performed by electronic counting instruments moved from location throughout the state in a program of continuous traffic count sampling. The resulting counts are adjusted to an estimate of annual average daily traffic by compensating for seasonal influence, weekly variation and other variables which may be present. Annual ADT is necessary for presenting a statewide picture of traffic flow, evaluating traffic trends, computing accident rates, planning and designing highways and other purposes.

Base Year – The year that the most current data is available to the Districts.

Bikeway Class I (Bike Path) – Provides a completely separated right of way for the exclusive use of bicycles and pedestrians with cross flow by motorists minimized.

Bikeway Class II (Bike Lane) – Provides a striped lane for one-way bike travel on a street or highway.

Bikeway Class III (Bike Route) – Provides for shared use with pedestrian or motor vehicle traffic.

Bikeway Class IV (Separated Bikeway/Cycle Track) – Provides for exclusive use for bicycles by separating bikeway from motor vehicle traffic.

Bottlenecks – A bottleneck is a location where traffic demand exceeds the effective carrying capacity of the roadway. In most cases, the cause of a bottleneck relates to a sudden reduction in capacity, such as a lane drop, merging and weaving, driver distractions, a surge in demand, or a combination of factors.

Capacity – The maximum sustainable hourly flow rate at which persons or vehicles reasonably can be expected to traverse a point or a uniform section of a lane or roadway during a given time period under prevailing roadway, environmental, traffic, and control conditions.

Capital Facility Concept – The 20-25 year vision of future development on the route to the capital facility. The capital facility can include capacity increasing, State Highway, bicycle facility, pedestrian facility, transit facility (Intercity Passenger Rail, Mass Transit Guideway etc.), grade separation, and new managed lanes.

Conceptual Project – A conceptual improvement or action is a project that is needed to maintain mobility or serve multimodal users, but is not currently included in a fiscally constrained plan and is not currently programmed. It could be included in a General Plan or in the unconstrained section of a long-term plan.

Corridor – A broad geographical band that follows a general directional flow connecting major sources of trips that may contain a number of streets, highways, bicycle, pedestrian, and transit route alignments. Off system facilities are included as informational purposes and not analyzed in the TCR.

Express Lanes – Specially designated highway lanes that are toll-free for carpools, vanpools, motorcycles, buses and eligible clean-air vehicles. Solo drivers can choose to pay a toll to access the lanes for reliable travel times.

Facility Concept – Describe the Facility and strategies that may be needed within 20-25 years. This can include capacity increasing, State Highway, bicycle facility, pedestrian facility, transit facility, Non-capacity increasing operational improvements, new managed lanes, conversion of existing managed lanes to another managed lane type or characteristic, TMS field elements, Transportation Demand Management and Incident Management.

Facility Type – The facility type describes the State Highway facility type. The facility could be freeway, expressway, conventional, or one-way city street.

Freight Generator – Any facility, business, manufacturing plant, distribution center, industrial development, or other location (convergence of commodity and transportation system) that produces significant commodity flow, measured in tonnage, weight, carload, or truck volume.

Headway – The time between two successive transit net vehicles as they pass a point on the roadway, measured from the same common feature of both vehicles.

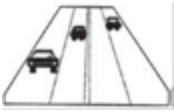
Horizon Year – The year that the future (20-25 years) data is based on.

Intermodal Freight Facility – Intermodal transport requires more than one mode of transportation. An intermodal freight facility is a location where different transportation modes and networks connect and freight is transferred (or “transloaded”) from one mode, such as rail, to another, such as truck.

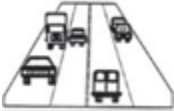
IRRS – The Interregional Road System, a series of interregional State highways outside the urbanized areas that provides access to, and links between, the State’s economic centers, major recreational areas, and urban and rural regions.

ITS – Intelligent Transportation System improves transportation safety and mobility and enhances productivity through the integration of advanced communications technologies into the transportation infrastructure and in vehicles. Intelligent Transportation Systems encompass a broad range of wireless and wireline communications-based information and electronics technologies to collect and process information, and take appropriate actions.

LOS – Level of Service is a qualitative measure describing operational conditions within a traffic stream and their perception by motorists. A LOS definition generally describes these conditions in terms of speed, travel time, freedom to maneuver, traffic interruption, comfort, and convenience. Six levels of LOS can generally be categorized as follows:



LOS A describes free flowing conditions. The operation of vehicles is virtually unaffected by the presence of other vehicles, and operations are constrained only by the geometric features of the highway.



LOS B is also indicative of free-flow conditions. Average travel speeds are the same as in LOS A, but drivers have slightly less freedom to maneuver.



LOS C represents a range in which the influence of traffic density on operations becomes marked. The ability to maneuver with the traffic stream is now clearly affected by the presence of other vehicles.



LOS D demonstrates a range in which the ability to maneuver is severely restricted because of the traffic congestion. Travel speed begins to be reduced as traffic volume increases.



LOS E reflects operations at or near capacity and is quite unstable. Because the limits of the level of service are approached, service disruptions cannot be damped or readily dissipated.



LOS F is a stop and go, low speed conditions with little or poor maneuverability. Speed and traffic flow may drop to zero and considerable delays occur. For intersections, LOS F describes operations with delay in excess of 60 seconds per vehicle. This level, considered by most drivers unacceptable often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection.

Multi-modal – The availability of transportation options using different modes within a system or corridor, such as automobile, subway, bus, ferry, rail, or air.

Managed Lanes – highway facilities or a set of lanes where operational strategies are proactively implemented and managed in response to changing conditions.

NHFS – a federally established freight network to strategically direct Federal resources and policies toward improved performance of highway portions of the U.S. freight transportation system.

National Highway System (NHS) – a federally established interconnected system of principle arterial routes to serve major travel destinations and population centers, international border crossings, as well as ports, airports, public transportation facilities, and other intermodal facilities. The NHS must also meet national defense requirements and serve interstate and interregional travel.

Peak Hour – The hour of the day in which the maximum volume occurs across a point on the highway.

Peak Hour Volume – The hourly volume during the highest hour traffic volume of the day traversing a point on a highway segment. It is generally between 6 percent and 10 percent of the ADT. The lower values are generally found on roadways with low volumes.

Planned Project – A planned improvement or action is a project in a fiscally constrained section of a long-term plan, such as an approved Regional or Metropolitan Transportation Plan (RTP or MTP), Capital Improvement Plan, or local Sales Tax Measure.

Post Mile – A post mile is an identified point on the State Highway System. The milepost values increase from the beginning of a route within a county to the next county line. The milepost values start over again at each county line. Milepost values usually increase from south to north or west to east depending upon the general direction the route follows within the State. The milepost at a given location will remain the same year after year. When a section of road is relocated, new milepost (usually noted by an alphabetical prefix such as "R" or "M") are established for it. If relocation results in a change in length, "milepost equations" are introduced at the end of each relocated portion so that mileposts on the remainder of the route within the county will remain unchanged.

Programmed Project – A programmed improvement or action is a project in a near-term programming document identifying funding amounts by year, such as the State Transportation Improvement Program (STIP) or the State Highway Operations and Protection Program (SHOPP).

Route Designation – A route's designation is adopted through legislation and identifies what system the route is associated with on the State Highway System. A designation denotes what design standards should apply during project development and design. Typical designations include but not limited to National Highway System (NHS), Interregional Route System (IRRS), and Scenic Highway System.

P3 - A public-private partnership, which is a cooperative arrangement between one or more public and private sectors.

Post 25-Year Concept – This dataset may be defined and re-titled at the District's discretion. In general, the post 25-year concept could provide the maximum reasonable and foreseeable roadway needed beyond a 20 to 25 year horizon. The post 25-year concept can be used to identify potential widenings, realignments, future facilities, and rights-of-way required to complete the development of each corridor.

Relinquishment – the act and the process of legally transferring property rights, title, liability, and maintenance responsibilities of a portion or entirety of a state highway or a park-and-ride lot to another entity.

Rural – Fewer than 5,000 in population designates a rural area. Limits are based upon population density as determined by the U.S. Census Bureau.

Segment – A portion of a facility between two points.

TDM – Transportation Demand Management programs designed to reduce or shift demand for transportation through various means, such as the use of public transportation, carpooling, telework, and alternative work hours. Transportation Demand Management strategies can be used to manage congestion during peak periods and mitigate environmental impacts.

TSMO – Integrated strategies to optimize the performance of existing infrastructure through the implementation of multimodal and intermodal, cross-jurisdictional systems, services, and projects, describing the system

operations and management elements that may be needed within 20-25 years. This can include Non-capacity increasing operational improvements (auxiliary lanes, channelization's, turnouts, etc.), conversion of existing managed lanes to another managed lane type or characteristic (e.g. HOV lane to HOT lane), TMS Field Elements, Transportation Demand Management, and Incident Management.

Urban – 5,000 to 49,999 in population designates an urban area. Limits are based upon population density as determined by the U.S. Census Bureau.

Urbanized – Over 50,000 in population designates an urbanized area. Limits are based upon population density as determined by the U.S. Census Bureau.

VMT – Is the total number of miles traveled by motor vehicles on a road or highway segments.

APPENDIX B Resources

2013 California State Rail Plan

<http://californiastaterailplan.dot.ca.gov/>

AC Transit Basic Rider Guide

<http://www.actransit.org/basic-rider-guide/>

AC Transit Major Corridors Study

<http://www.actransit.org/coa-2/major-corridors-study/>

Assembly Bill No. 157, the California Legislative Information

http://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160AB157

The Bay Trail

<http://www.baytrail.org/maps.html>

Berkeley Global Campus at Richmond Bay

http://richmondbaycampus.lbl.gov/environmental_documents.html

California Department of Fish and Wildlife Biogeographic Information and Observation System (BIOS) Habitat Connectivity Viewer

<http://www.dfg.ca.gov/biogeodata/bios/>

California Department of Fish and Wildlife Biogeographic Information and Observation System (BIOS) Map Viewer

<http://www.calfish.org/DataandMaps/MapView.aspx>

California Road System (CRS) Maps

http://www.dot.ca.gov/hq/tsip/hseb/crs_maps/

California Wild & Scenic River System

http://www.dot.ca.gov/ser/vol1/sec3/special/ch19wsrivers/CA_System_Rivers.doc

Caltrans Areas Likely to Contain Naturally Occurring Asbestos Map

http://onramp.dot.ca.gov/hq/maint/roadway_rehab/gis/nao.htm

Farmland Mapping and Monitoring Program, the Department of Conservation

<http://www.conservation.ca.gov/dlrp/fmmp>

The Federal Highway Administration, Section 4(f) Program

<http://www.environment.fhwa.dot.gov/4f/4ffiveminute.asp>

FEMA Flood Map Service Center

<http://msc.fema.gov/portal>

The Golden Gate Bridge, Highway and Transportation District

<http://goldengate.org/>

The Hayward Fault, UC-Berkeley Seismological Lab

http://seismo.berkeley.edu/hayward/hayward_fault.html

I-80 SMART Corridor Project

<http://80smartcorridor.org/>

Kaiser Permanente Richmond

http://mydoctor.kaiserpermanente.org/ncal/facilities/region/eastbay/area_master/about_us/richmond/index.jsp

National and State Area Designations Maps

<http://www.arb.ca.gov/desig/adm/adm.htm>

National Highway System

http://www.fhwa.dot.gov/planning/national_highway_system/

The Plan Bay Area 2013, Metropolitan Transportation Commission,

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<http://main.sonomamarintrain.org/>

South Richmond Transportation Connectivity Plan

<http://www.ci.richmond.ca.us/2776/SRTCP>

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Traffic Accident Surveillance and Analysis System Highway Sequence Listing (with cities), District 04

<http://onramp.dot.ca.gov/tsi/ohsip/tasas/sequencelisting/district04.pdf>

The University of California – Berkeley Shuttle

<http://pt.berkeley.edu/around/beartransit/daytime>

APPENDIX C

Additional Transit Service within the I-580 West Corridor

Capitol Corridor²⁹

The Capitol Corridor extends 169 rail miles from Auburn to San Jose. The route is owned by UPRR, except for three miles between Santa Clara and San Jose which is owned by the Peninsula Corridor Joint Powers Board. Amtrak operates the trains through its contract with the Capitol Corridor Joint Powers Authority (CCJPA). The CCJPA coordinates functions such as marketing, scheduling, and on-board services with Amtrak, and also coordinates some functions with Caltrans, such as marketing. The State funds the service and owns all equipment in the Northern California fleet (used by both the Capitol Corridor and the San Joaquin Corridor), while Amtrak provides maintenance and CCJPA oversees Amtrak's maintenance work.

The Capitol Corridor has seven daily round trips between Oakland and San Jose, fifteen weekday round trips between Sacramento and Oakland (eleven on weekends), with one daily round trip extending from Sacramento to Auburn. In the Bay Area, the Capitol Corridor serves the stations of Suisun-Fairfield, Martinez, Richmond, Berkeley, Emeryville, Oakland Jack London Square, Oakland Coliseum, Hayward, Fremont-Centerville, Great America, Santa Clara University, and San Jose Diridon. The speed between Sacramento and Oakland averages 45 mph in the eastbound direction and 47 mph in the westbound direction. The speed between Oakland and San Jose averages 40 mph in the eastbound direction and 34 mph in the westbound direction. Currently, Sacramento-Oakland travel times average two hours in the eastbound direction and one hour and 54 minutes in the westbound direction. Oakland-San Jose travel times average one hour and four minutes in the eastbound direction and one hour and 17 minutes in the westbound direction. For Fiscal Year 2011-12, the Capitol Corridor had a ridership of 1,770,616 and a farebox ratio of 49.6 percent.

San Joaquin Corridor

The San Joaquin Corridor extends 316 route miles between Oakland and Bakersfield with thirteen intermediate stops. In addition, the Stockton-Sacramento segment of the route extends 49 miles with one intermediate stop. BNSF owns most of the right-of-way along this route (Port Chicago-Bakersfield); however, UP owns 39 miles at the north end of the route between Oakland and Port Chicago and 49 miles in the segment between Stockton and Sacramento. The State and Amtrak share operating responsibility for the San Joaquin Corridor. The State funds the route's operation, Amtrak operates the trains, and Caltrans is responsible for the oversight of the San Joaquin service through its operating contract with Amtrak. Caltrans coordinates functions such as marketing, scheduling, and on board services with Amtrak. The State owns all San Joaquin equipment, while Amtrak maintains it.

There are currently six daily round trip trains on the San Joaquin Corridor, of which, four run between Oakland and Bakersfield and two run between Sacramento and Bakersfield. In the Bay Area, the San Joaquin line serves the stations of Oakland, Emeryville, Richmond, Martinez and Antioch-Pittsburg. Overall average speed between Bakersfield and Oakland, including station dwell time, is 51.4 mph and the average travel time between Bakersfield and Oakland is six hours and nine minutes. For Fiscal Year 2011-12, the San Joaquin Corridor had a ridership of about 1.1 million and a farebox ratio of 55.0 percent.

California Zephyr

California Zephyr is an Amtrak long-distance route that provides daily round trip linking Emeryville to Chicago. En route to Chicago, it serves Sacramento, Reno, Salt Lake City, Denver and Omaha. In the Bay Area, the California Zephyr line serves the stations of Emeryville, Richmond and Martinez.

Between Emeryville and Martinez, all three Amtrak routes run on the same tracks, approximately parallel to I-80 and portion of the I-580 West corridor. Amtrak Coast Starlight, another long-distance route that provides a daily

²⁹ Amtrak related information is from 2013 California State Rail Plan, available at: <http://californiastaterailplan.dot.ca.gov/>

round trip between Los Angeles and Seattle also operates on the same tracks, serving Emeryville and Martinez, but not Richmond Station. The California Thruway buses also provide connections from Emeryville to San Francisco. Future improvements include a new station in Hercules that would connect Amtrak to other local transit services.

BART

The San Francisco Bay Area Rapid Transit District (BART) operates a system of grade-separated, electric heavy rail trains connecting East Bay and Peninsula cities and San Francisco to employment centers and recreation destinations. BART operates five lines (four Transbay and one East Bay only) generally identified by the names of their termini: Fremont-Daly City, Dublin/Pleasanton-Daly City, Pittsburg/Bay Point-SFO/Millbrae, Richmond-Daly City/Millbrae, and Richmond-Fremont. BART lines total 104 miles of track with 44 stations in four counties (San Francisco, Alameda, Contra Costa, and San Mateo). Bikes are allowed on BART trains except for the first car, while bike storage facilities are provided at all BART stations. Currently, BART serves an average weekday ridership of over 400,000.³⁰

Richmond-Daly City/Millbrae and Richmond-Fremont lines run generally parallel to I-580 West and provide service to the stations of El Cerrito Plaza, El Cerrito del Norte and Richmond. All three stations serve as intermodal hubs for connections to various bus services and transfer to Amtrak can be made at the Richmond Station. The two El Cerrito stations are served by the Ohlone Greenway as well. Currently there is a transit study underway that could potentially extend BART beyond the Richmond BART station in West Contra Costa County.

AC Transit

AC Transit is the third-largest public bus system in California, serving thirteen cities and adjacent unincorporated areas in Alameda and Contra Costa Counties. AC Transit serves 5,500 bus stops with 124 local lines; 32 transbay lines; and six All-Nighter lines. AC Transit service provides connections to 21 BART stations, six Amtrak stations, three ferry terminals, and nine other bus systems.

